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**Notes:**

1. Untranslatable words are replaced with asterisks (\*\*\*\*).
2. Texts in the figures are not translated and shown as it is.

Translated: 02:07:27 JST 01/06/2010

Dictionary: Last updated 12/14/2009 / Priority:

[Document Name]Description

[Title of the Invention]White luminescence organic electroluminescence element

[Claim(s)]

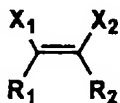
[Claim 1]A white luminescence organic electroluminescence element characterized by the following.

At least one sort of compounds chosen from a compound expressed with following general formula (A1-1) - (F1-5) to at least one layer, respectively.

And luminescence is real white.

[Chemical formula 1]

一般式(A1-1)

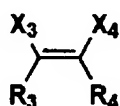


[X<sub>1</sub> and X<sub>2</sub> express an aryl group or a heterocyclic machine among a formula, and R<sub>1</sub> and R<sub>2</sub> express an aryl group, a heterocyclic machine, a residue of alicyclic hydrocarbon, or a cycloalkoxy machine, and R<sub>2</sub> either one of R<sub>1</sub> or expresses a residue or a cycloalkoxy machine of

alicyclic hydrocarbon.  $R_1$  and  $R_2$  may form an alicyclic or heterocyclic ring. ]

[Chemical formula 2]

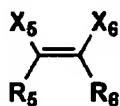
一般式(A1-2)



[ $X_3$  and  $X_4$  express an aryl group or a heterocyclic machine among a formula, and  $R_3$ ,  $R_4$  expresses an aryl group, a heterocyclic machine, an aryloxy group, an alkylthio group, or an arylthio group, and  $R_4$  either one of  $R_3$  or expresses an aryloxy group, an alkylthio group, or an arylthio group. ]

[Chemical formula 3]

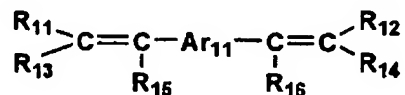
一般式(A1-3)



[ $X_5$  and  $X_6$  express an aryl group or a heterocyclic machine among a formula, and  $R_5$  and  $R_6$  express an aryl group, a heterocyclic machine, and a halogen atom, and  $R_6$  either one of  $R_5$  or expresses a halogen atom. ]

[Chemical formula 4]

一般式(A1-4)



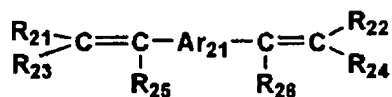
[Although  $Ar_{11}$  expresses the Ally Wren machine among a formula,  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ , and  $R_{14}$  express a hydrogen atom or a substituent and  $R_{15}$  and  $R_{16}$  express a hydrogen atom or a



substituent, even if there are little  $R_{15}$  and  $R_{16}$ , either expresses the residue of alicyclic hydrocarbon. ]

[Chemical formula 5]

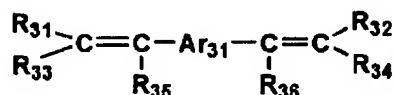
一般式(A1-5)



[Although  $Ar_{21}$  expresses the Ally Wren machine among a formula,  $R_{21}$ ,  $R_{22}$ ,  $R_{23}$ , and  $R_{24}$  express a hydrogen atom or a substituent and  $R_{25}$  and  $R_{26}$  express a hydrogen atom or a substituent, Even if there are little  $R_{25}$  and  $R_{26}$ , either expresses an aryloxy group, an alkylthio group, or an arylthio group. ]

[Chemical formula 6]

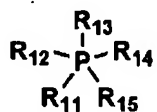
一般式(A1-6)



[Although  $Ar_{31}$  expresses the Ally Wren machine among a formula,  $R_{31}$ ,  $R_{32}$ ,  $R_{33}$ , and  $R_{34}$  express a hydrogen atom or a substituent and  $R_{35}$  and  $R_{36}$  express a hydrogen atom or a substituent, even if there are little  $R_{35}$  and  $R_{36}$ , either expresses a halogen atom. ]

[Chemical formula 7]

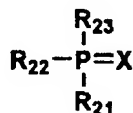
一般式(A2-1)



[P expresses a phosphorus atom among a formula and  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$ , and  $R_{15}$  express the substituent of 1 value. ]

[Chemical formula 8]

## 一般式(A2-2)



[P expresses a phosphorus atom among a formula,  $\text{R}_{21}$ ,  $\text{R}_{22}$ , and  $\text{R}_{23}$  express the substituent of 1 value, and X expresses a chalcogen atom. ]

[Chemical formula 9]

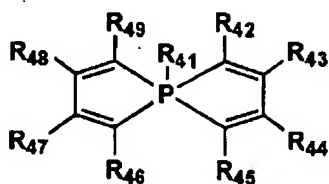
## 一般式(A2-3)



[P expresses a phosphorus atom among a formula,  $\text{R}_{31}$  expresses the substituent of 1 value, and  $\text{X}_{31}$ ,  $\text{X}_{32}$ ,  $\text{X}_{33}$ ,  $\text{X}_{34}$ ,  $\text{X}_{35}$ ,  $\text{X}_{36}$ ,  $\text{X}_{37}$ , and  $\text{X}_{38}$  express a nitrogen atom or C- $\text{R}_{32}$ , respectively. when the plurality of  $\text{X}_{31}$ ,  $\text{X}_{32}$ ,  $\text{X}_{33}$ ,  $\text{X}_{34}$ ,  $\text{X}_{35}$ ,  $\text{X}_{36}$ ,  $\text{X}_{37}$ , and  $\text{X}_{38}$  is denoted by C- $\text{R}_{32}$ , each may be the same or may differ.  $\text{R}_{32}$  expresses the substituent of 1 value. ]

[Chemical formula 10]

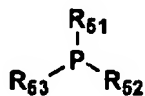
## 一般式(A2-4)



[P expresses a phosphorus atom among a formula and  $\text{R}_{41}$ ,  $\text{R}_{42}$ ,  $\text{R}_{43}$ ,  $\text{R}_{44}$ ,  $\text{R}_{45}$ ,  $\text{R}_{46}$ ,  $\text{R}_{47}$ ,  $\text{R}_{48}$ , and  $\text{R}_{49}$  express the substituent of 1 value. ]

[Chemical formula 11]

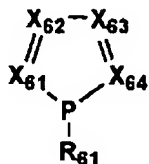
## 一般式(A2-5)



[P expresses a phosphorus atom among a formula and  $\text{R}_{51}$ ,  $\text{R}_{52}$ , and  $\text{R}_{53}$  express the substituent of 1 value. ]

[Chemical formula 12]

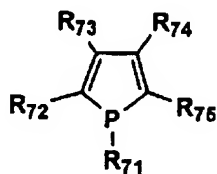
## 一般式(A2-6)



[P expresses a phosphorus atom among a formula,  $\text{R}_{61}$  expresses the substituent of 1 value, and  $\text{X}_{61}$ ,  $\text{X}_{62}$ ,  $\text{X}_{63}$ , and  $\text{X}_{64}$  express a nitrogen atom or  $\text{C}-\text{R}_{62}$ , respectively. when the plurality of  $\text{X}_{61}$ ,  $\text{X}_{62}$ ,  $\text{X}_{63}$ , and  $\text{X}_{64}$  is denoted by  $\text{C}-\text{R}_{62}$ , each may be the same or may differ.  $\text{R}_{62}$  expresses the substituent of 1 value. ]

[Chemical formula 13]

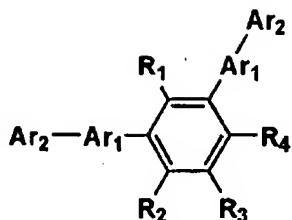
## 一般式(A2-7)



[P expresses a phosphorus atom among a formula and  $\text{R}_{71}$ ,  $\text{R}_{72}$ ,  $\text{R}_{73}$ ,  $\text{R}_{74}$ , and  $\text{R}_{75}$  express the substituent of 1 value. ]

[Chemical formula 14]

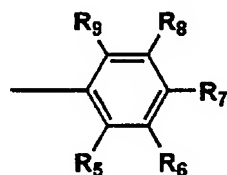
## 一般式(B1-1)



[ $R_1 - R_4$  express independently the alkyl group which is not replaced [ a hydrogen atom, substitution, or ], a cycloalkyl machine, an alkoxy group, or a halogen atom among a formula, respectively,  $Ar_1$  expresses a divalent aromatic hydrocarbon machine, and  $Ar_2$  expresses the aryl group denoted by the following general formula (B1-2). ]

[Chemical formula 15]

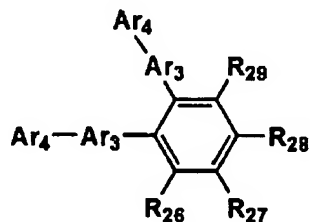
## 一般式(B1-2)



[ $R_9$  expresses among a formula the alkyl group which is not replaced [ a hydrogen atom, substitution, or ], a cycloalkyl machine, an alkoxy group, or a halogen atom,  $R_5 - R_9$  express a hydrogen atom or a substituent independently, respectively, and that which adjoins among  $R_5 - R_9$  may form a ring unitedly. ]

[Chemical formula 16]

## 一般式(B1-6)

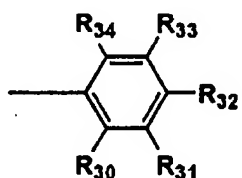


[ $R_{26} - R_{29}$  express independently the alkyl group which is not replaced [ a hydrogen atom,

substitution, or ], a cycloalkyl machine, an alkoxy group, or a halogen atom among a formula, respectively,  $Ar_3$  expresses a divalent aromatic hydrocarbon machine, and  $Ar_4$  expresses the aryl group denoted by the following general formula (B1-7). ]

[Chemical formula 17]

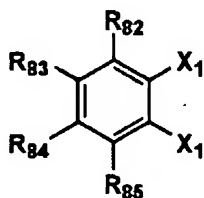
一般式(B1-7)



[ $R_{34}$  expresses among a formula the alkyl group which is not replaced [ a hydrogen atom, substitution, or ], a cycloalkyl machine, an alkoxy group, or a halogen atom,  $R_{30}$  -  $R_{33}$  express a hydrogen atom or a substituent independently, respectively, and that which adjoins among  $R_{30}$  -  $R_{34}$  may form a ring unitedly. ]

[Chemical formula 18]

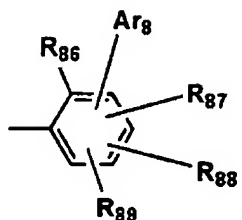
一般式(B1-11)



[ $R_{82}$  -  $R_{85}$  express independently the aryl group or halogen atom which is not replaced [ the alkyl group which is not replaced / a hydrogen atom, substitution, or /, a cycloalkyl machine, an alkoxy group, substitution, or ] among a formula, respectively, and  $X_1$  expresses the aryl group denoted by the following general formula (B1-12). ]

[Chemical formula 19]

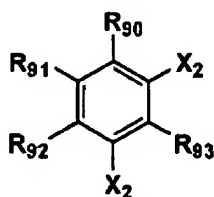
## 一般式(B1-12)



[R<sub>86</sub> expresses an alkyl group, an alkoxy group, and a halogen atom among a formula, and R<sub>87</sub> - R<sub>89</sub> express independently the aryl group or halogen atom which is not replaced [ a hydrogen atom, an alkyl group, an alkoxy group, substitution, or ], respectively. Ar<sub>8</sub> expresses an aromatic hydrocarbon machine. ]

[Chemical formula 20]

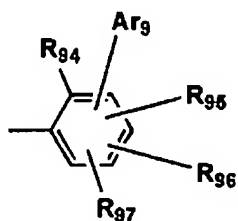
## 一般式(B1-13)



[R<sub>90</sub> - R<sub>93</sub> express independently the aryl group or halogen atom which is not replaced [ the alkyl group which is not replaced / a hydrogen atom, substitution, or /, a cycloalkyl machine, an alkoxy group, substitution, or ] among a formula, respectively, and X<sub>2</sub> expresses the aryl group denoted by the following general formula (B1-14). ]

[Chemical formula 21]

## 一般式(B1-14)

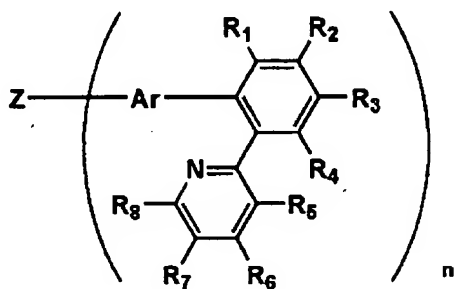


[R<sub>94</sub> expresses an alkyl group, an alkoxy group, and a halogen atom among a formula, and

$R_{95} - R_{97}$  express independently the aryl group or halogen atom which is not replaced [ a hydrogen atom, an alkyl group, an alkoxy group, substitution, or ], respectively.  $Ar_9$  expresses an aromatic hydrocarbon machine. ]

[Chemical formula 22]

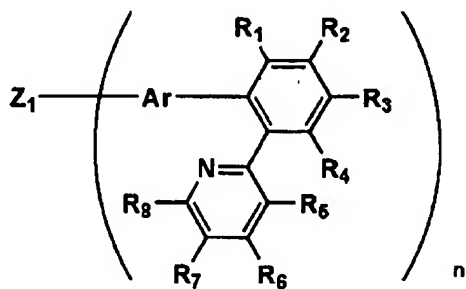
一般式(B2-1)



[Z expresses an n-valent connection machine or mere joint hand among a formula, Ar expresses the divalent Ally Wren machine, and  $R_1 - R_8$  express a hydrogen atom or a substituent respectively. n expresses or more 2 an integer less than or equal to 6. The substituents which adjoin among  $R_1 - R_8$  may be condensed mutually, and they may form a ring. ]

[Chemical formula 23]

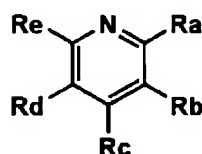
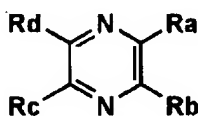
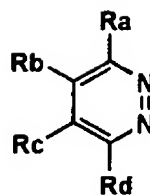
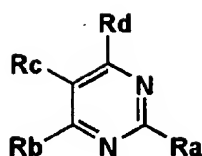
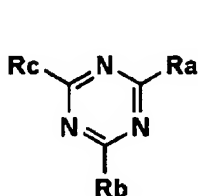
一般式(B2-2)



[Inside of formula, and  $Z_1$

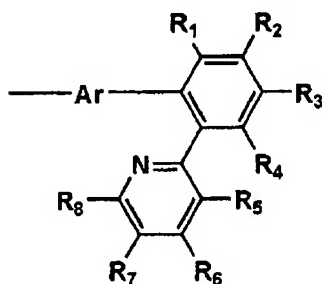
[Chemical formula 24]

$Z_1$ :



Carrying out a table, n expresses or more 2 six or less substituent. It is at least two of  $R_a - R_e$ ,

[Chemical formula 25]

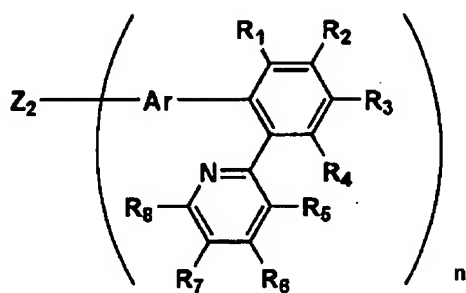


It comes out, and it is a substituent expressed, and these two or more substituents may be the same, or may be different. What is not this substituent among  $R_a - R_e$  expresses a hydrogen atom or arbitrary substituents respectively, adjoining substituents may be condensed mutually and they may form a ring. Ar expresses the divalent Ally Wren machine and  $R_1 - R_8$  express a hydrogen atom or a substituent respectively. The substituents which adjoin among  $R_1 - R_8$  may be condensed mutually, and they may form a ring. ]

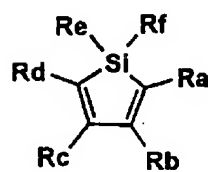
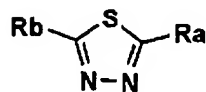
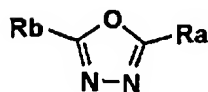
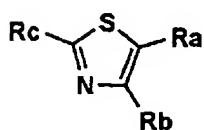
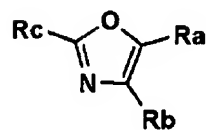
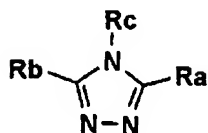
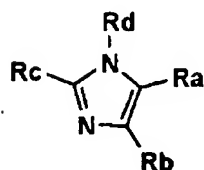
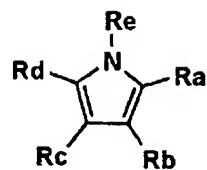
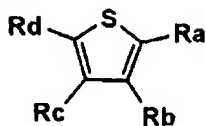
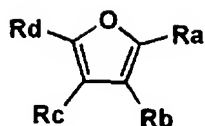


[Chemical formula 26]

一般式(B2-3)

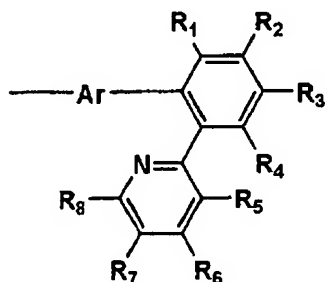
[Inside of formula, and  $Z_2$ 

[Chemical formula 27]

$Z_2$ :

Carrying out a table, n expresses or more 2 six or less substituent. It is at least two of  $R_a - R_f$ .

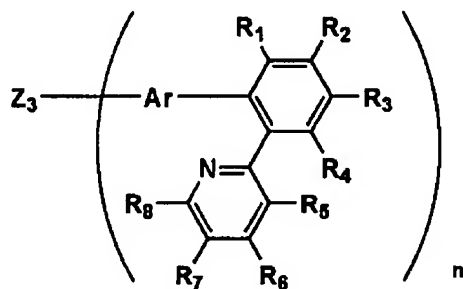
[Chemical formula 28]



It comes out, and it is a substituent expressed, and these two or more substituents may be the same, or may be different. What is not this substituent among  $R_a - R_f$  expresses a hydrogen atom or arbitrary substituents respectively, adjoining substituents may be condensed mutually and they may form a ring.  $Ar$  expresses the divalent Ally Wren machine and  $R_1 - R_8$  express a

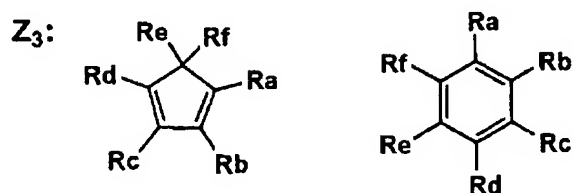
hydrogen atom or a substituent respectively. The substituents which adjoin among  $R_1 - R_8$  may be condensed mutually, and they may form a ring. ]  
 [Chemical formula 29]

一般式(B2-4)

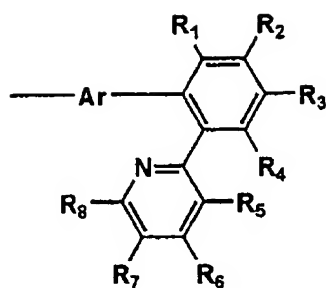


[Inside of formula, and  $Z_3$

[Chemical formula 30]



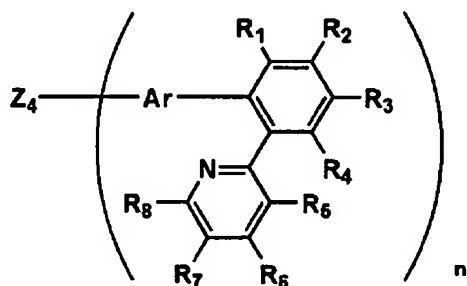
Carrying out a table, n expresses or more 2 six or less substituent. It is at least two of  $R_a - R_f$ .  
 [Chemical formula 31]



It comes out, and it is a substituent expressed, and these two or more substituents may be the same, or may be different. What is not this substituent among  $R_a - R_f$  expresses a hydrogen atom or arbitrary substituents respectively, adjoining substituents may be condensed mutually and they may form a ring. Ar expresses the divalent Ally Wren machine and  $R_1 - R_8$  express a hydrogen atom or a substituent respectively. The substituents which adjoin among  $R_1 - R_8$  may be condensed mutually, and they may form a ring. ]

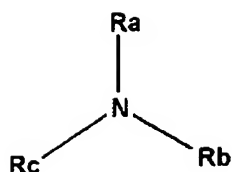
[Chemical formula 32]

一般式(B2-5)



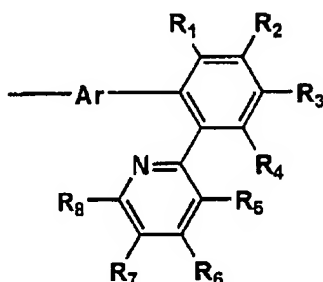
[Inside of formula, and  $Z_4$

[Chemical formula 33]

$Z_4$ :

Carrying out a table,  $n$  expresses 2 or 3. It is at least two of  $R_a - R_c$ .

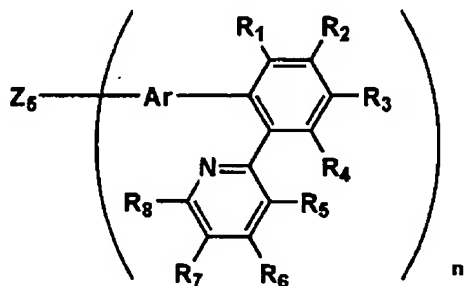
[Chemical formula 34]



It comes out, and it is a substituent expressed, and these two or more substituents may be the same, or may be different. What is not this substituent among  $R_a - R_c$  expresses a hydrogen atom or arbitrary substituents respectively.  $Ar$  expresses the divalent Ally Wren machine and  $R_1 - R_8$  express a hydrogen atom or a substituent respectively. The substituents which adjoin among  $R_1 - R_8$  may be condensed mutually, and they may form a ring. ]

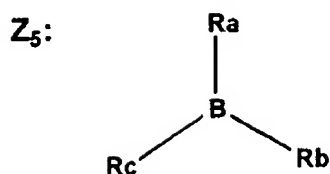
[Chemical formula 35]

一般式(B2-6)



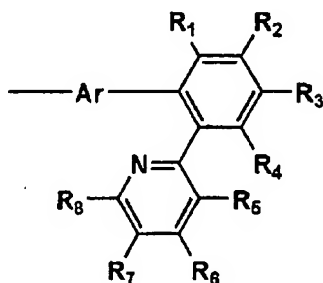
[Inside of formula, and  $Z_5$

[Chemical formula 36]



Carrying out a table, n expresses 2 or 3. It is at least two of  $R_a - R_c$ .

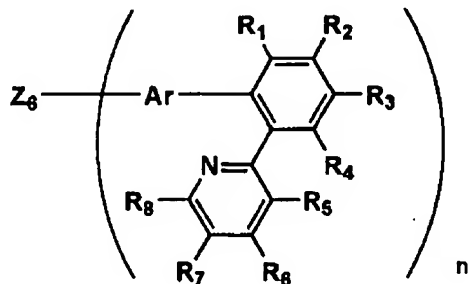
[Chemical formula 37]



It comes out, and it is a substituent expressed, and these two or more substituents may be the same, or may be different. What is not this substituent among  $R_a - R_c$  expresses a hydrogen atom or arbitrary substituents respectively. Ar expresses the divalent Ally Wren machine and  $R_1 - R_8$  express a hydrogen atom or a substituent respectively. The substituents which adjoin among  $R_1 - R_8$  may be condensed mutually, and they may form a ring. ]

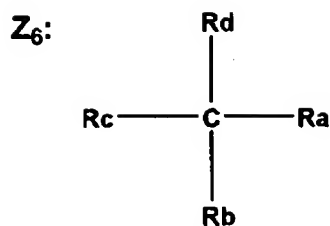
[Chemical formula 38]

一般式(B2-7)



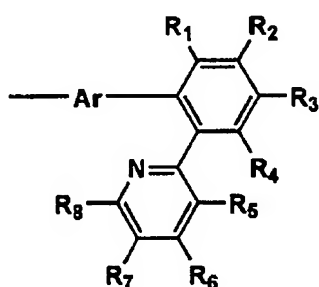
[Inside of formula, and  $Z_6$

[Chemical formula 39]



Carrying out a table, n expresses 2 or 3. It is at least two of R<sub>a</sub> - R<sub>d</sub>.

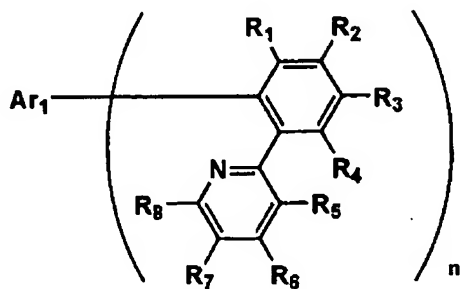
[Chemical formula 40]



It comes out, and it is a substituent expressed, and these two or more substituents may be the same, or may be different. What is not this substituent among R<sub>a</sub> - R<sub>d</sub> expresses a hydrogen atom or arbitrary substituents respectively, adjoining substituents may be condensed mutually and they may form a ring. Ar expresses the divalent Ally Wren machine and R<sub>1</sub> - R<sub>8</sub> express a hydrogen atom or a substituent respectively. The substituents which adjoin among R<sub>1</sub> - R<sub>8</sub> may be condensed mutually, and they may form a ring. ]

[Chemical formula 41]

一般式(B2-8)

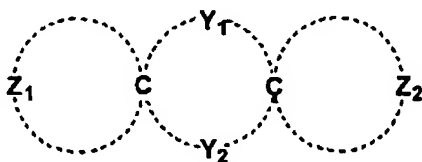


[Ar<sub>1</sub> expresses the Ally Wren machine of m value among a formula, and R<sub>1</sub> - R<sub>8</sub> express a

hydrogen atom or a substituent respectively.  $n$  expresses or more 2 an integer less than or equal to 6. The substituents which adjoin among  $R_1 - R_8$  may be condensed mutually, and they may form a ring. ]

[Chemical formula 42]

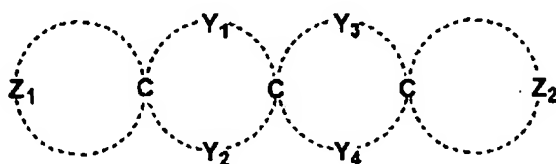
一般式(B3-1)



[C expresses a carbon atom among a formula,  $Y_1$  and  $Y_2$  express a divalent machine required to form four membered-rings - eight membered-rings with two carbon atoms independently respectively, and  $Z_1$  and  $Z_2$  express an atomic group required to form a five-membered ring - eight membered-rings with a carbon atom independently respectively. The five-membered ring formed with the five-membered ring - eight membered-rings and  $Z_2$  which are formed with  $Z_1$  and a carbon atom, and a carbon atom - eight membered-rings have at least one aromatic series ring as a condensed ring respectively. ]

[Chemical formula 43]

一般式(B3-2)



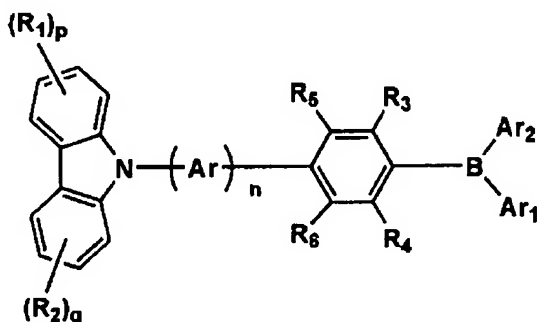
[C expresses a carbon atom among a formula,  $Y_1$  and  $Y_2$  express an atomic group required to form four membered-rings - eight membered-rings with two carbon atoms independently respectively, or a mere joint hand, and  $Y_3$  and their  $Y_4$  are respectively synonymous with this  $Y_1$  and  $Y_2$ .  $Z_1$  and  $Z_2$  express an atomic group required to form a five-membered ring - eight membered-rings with a carbon atom independently respectively. The five-membered ring



formed with the five-membered ring - eight membered-rings and  $Z_2$  which are formed with  $Z_1$  and a carbon atom, and a carbon atom - eight membered-rings have at least one aromatic series ring as a condensed ring respectively. ]

[Chemical formula 44]

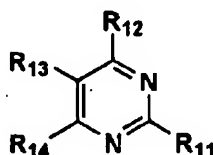
一般式(B4-1)



( $R_1$  and  $R_2$  express a substituent independently among a formula, respectively, Ar expresses the divalent Ally Wren machine, n expresses the integer of 0-8, p expresses the integer of 1-4, and q expresses the integer of 1-4.) When two or more  $R_1$  may be the same, or it may differ, when p expresses an integer greater than or equal to 2, and q expresses an integer greater than or equal to 2, two or more  $R_2$  may be the same, or may differ. When p is two or more, and when two or more  $R_1$  adjoins, it may condense mutually and the ring may be formed, when q is two or more, and when two or more  $R_2$  adjoins, it may condense mutually and the ring may be formed, and also a ring may be formed by  $R_1$  and  $R_2$ .  $R_3 - R_6$  may express a hydrogen atom or a substituent, and may form a ring by  $R_3$ ,  $R_5$  and/or  $R_4$ , and  $R_6$ . However, either [ at least ]  $R_3$  or  $R_4$  expresses a substituent.  $Ar_1$  and  $Ar_2$  express an aryl group independently, respectively.

[Chemical formula 45]

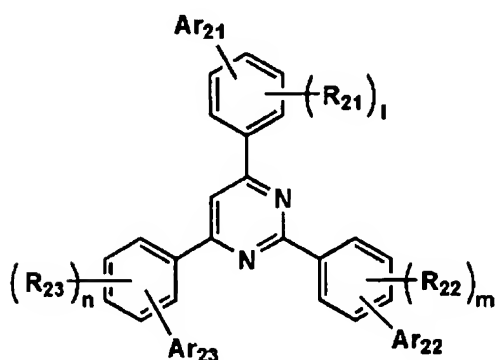
一般式(B5-1)



[ $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ , and  $R_{14}$  express the substituent of a hydrogen atom or 1 value among a formula, and at least one expresses the substituent combined via a carbon atom, an oxygen atom, a sulfur atom, or a silicon atom. ]

[Chemical formula 46]

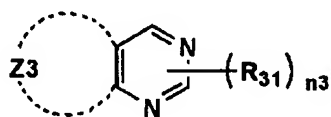
一般式(B5-2)



[ $Ar_{21}$ ,  $Ar_{22}$ , and  $Ar_{23}$  express an aromatic series machine among a formula, and  $R_{21}$ ,  $R_{22}$ , and  $R_{23}$  express the substituent of 1 value.  $l$ ,  $m$ , and  $n$  express the integer of 0-4, respectively. ]

[Chemical formula 47]

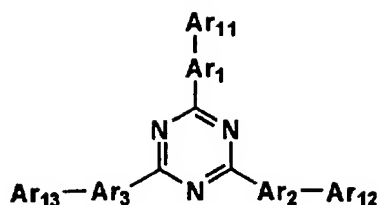
一般式(B5-3)



[ $R_{31}$  expresses the substituent of a hydrogen atom or 1 value among a formula,  $n3$  expresses 0-2, and  $Z3$  expresses an atomic group required to form a five-membered ring. ]

[Chemical formula 48]

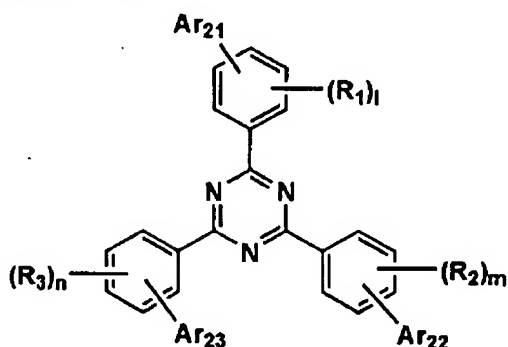
## 一般式(B6-1)



[Ar<sub>1</sub>, Ar<sub>2</sub>, and Ar<sub>3</sub> express 6 member aromatic series machine among a formula, and Ar<sub>11</sub>, Ar<sub>12</sub>, and Ar<sub>13</sub> express 6 member aromatic series machine or 5 member monocycle aromatic series machine. ]

[Chemical formula 49]

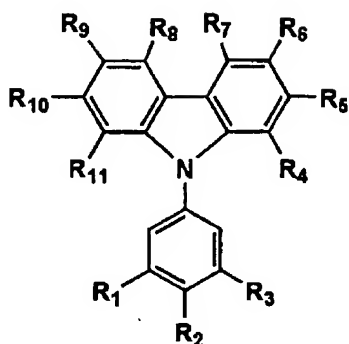
## 一般式(B6-2)



[Ar<sub>21</sub>, Ar<sub>22</sub>, and Ar<sub>23</sub> express 6 member aromatic series machine or 5 member monocycle aromatic series machine among a formula, and R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> express the substituent of 1 value. l, m, and n express the integer of 1-4, respectively. ]

[Chemical formula 50]

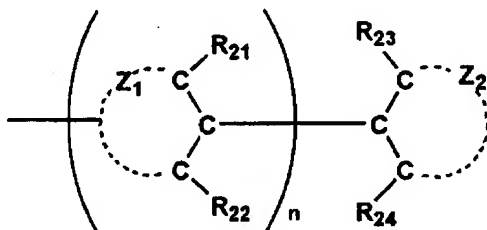
## 一般式(B7-1)



[ $R_1 - R_{11}$  express a hydrogen atom or a substituent respectively among a formula. However, it combines with each other and the substituent which at least one of  $R_1 - R_3$  has the structure denoted by the following general formula (B7-2), and is denoted by  $R_1 - R_3$  does not form a ring. ]

[Chemical formula 51]

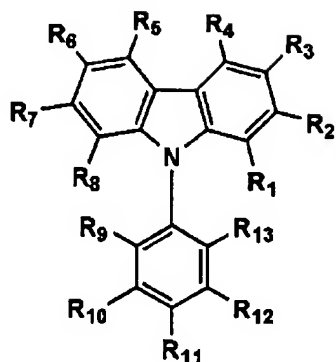
## 一般式(B7-2)



[, [ among a formula ] [  $Z_1$  and  $Z_2$  ] [ an atomic group required to form an aromatic ring,  $R_{21} - R_{24}$  ] A hydrogen atom or a substituent is expressed respectively,  $n$  expresses 0 or 1, when  $n$  is 0, at least one of  $R_{23}$  or the  $R_{24}$  expresses a substituent, and when  $n$  is 1, at least two,  $R_{21} - R_{24}$ , express a substituent. ]

[Chemical formula 52]

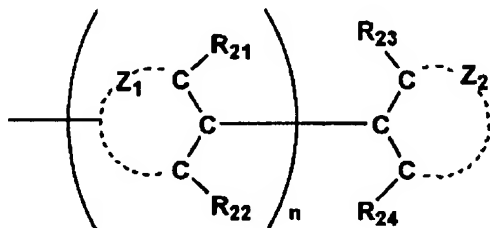
## 一般式(B8-1)



( $R_1 - R_{13}$  express the substituent of a hydrogen atom or 1 value among a formula, and at least one of  $R_1$  - the  $R_8$  has before long the structure shown in the following general formula (B8-1-1).)

[Chemical formula 53]

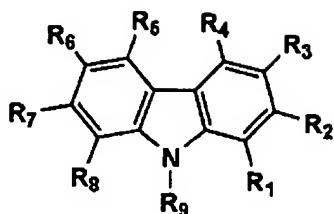
## 一般式(B8-1-1)



[When an atomic group required for  $Z_1$  and  $Z_2$  to form an aromatic ring,  $R_{21} - R_{24}$  express the substituent of a hydrogen atom or 1 value among a formula,  $n$  expresses 0 or 1 and  $n$  is 0, At least one of  $R_{23}$  and the  $R_{24}$  expresses the substituent of 1 value, and when  $n$  is 1, at least one of  $R_{21}$  - the  $R_{24}$  expresses the substituent of 1 value. ]

[Chemical formula 54]

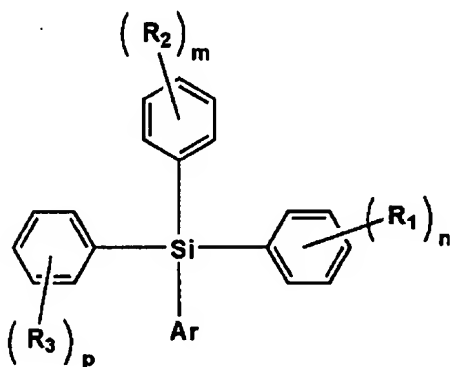
## 一般式(B9-1)



[ $R_1 - R_8$  express a hydrogen atom, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkylthio group, an arylthio group, an amino group, an alkylamino group, an arylamino group, a heterocyclic group, or a silyl group respectively among a formula, and  $R_9$  expresses an alkyl group.]

[Chemical formula 55]

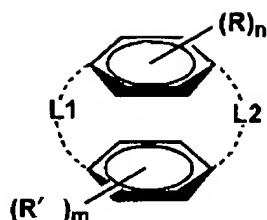
## 一般式(B10-1)



( $R_1 - R_3$  express an alkyl group, an alkoxy group, an aryloxy group, or a halogen atom independently among a formula, respectively,  $n$  expresses the integer of 0-5,  $m$  expresses the integer of 0-5,  $p$  expresses the integer of 0-5, and Ar expresses a condensation aromatic series group.)  $n$  -- plurality -- and -- when two or more  $R_1$  adjoins, it may condense mutually and a ring may be formed --  $m$  -- plurality -- and -- when two or more  $R_2$  adjoins, it may condense mutually and a ring may be formed --  $p$  -- plurality -- and when two or more  $R_3$  adjoins, it may condense mutually and a ring may be formed.

[Chemical formula 56]

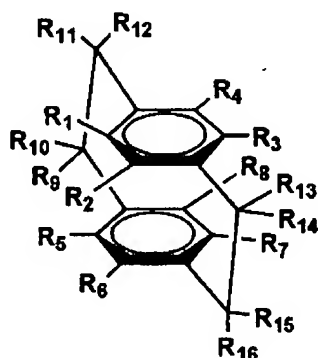
## 一般式(B11-1)



[R and R' expresses a substituent independently among a formula, respectively, n expresses the integer of 0-4, m expresses the integer of 0-4 and L1 and L2 express a divalent connection machine independently, respectively. When two or more R may be condensed mutually and may form a ring, when n expresses an integer greater than or equal to 2, and m expresses an integer greater than or equal to 2, two or more R' may be condensed mutually and may form a ring. ]

[Chemical formula 57]

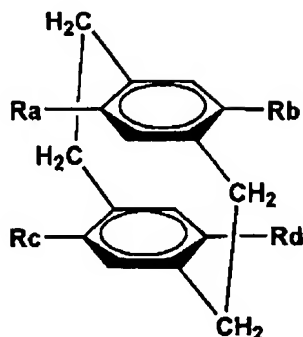
## 一般式(B11-2)



[R<sub>1</sub> - R<sub>8</sub> express a hydrogen atom or a substituent inside, and R<sub>9</sub> - R<sub>16</sub> express a hydrogen atom or a substituent. ]

[Chemical formula 58]

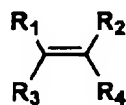
## 一般式(B11-3)



[Ra, Rb, Rc, and Rd express a hydrogen atom or a substituent among a formula, and at least one of them expresses an aryl group, an amino group, an alkenyl group, or an alkynyl group.]

[Chemical formula 59]

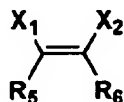
## 一般式(C1-1-1)



[Among a formula,  $R_1$ ,  $R_2$ ,  $R_3$ , and  $R_4$  express a hydrogen atom, an alkyl group, an alkoxy group, an aryl group, a heterocyclic machine, or a cyano group, and at least one substituent of  $R_1$ ,  $R_2$ ,  $R_3$ , and  $R_4$  expresses an aryl group or a heterocyclic machine.]

[Chemical formula 60]

## 一般式(C1-1-2)

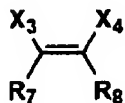


[ $X_1$  and  $X_2$  express an aryl group or a heterocyclic machine among a formula, and  $R_5$  and  $R_6$  express an aryl group, a heterocyclic machine, or the residue of alicyclic hydrocarbon, and  $R_6$  either one of  $R_5$  or expresses the residue of alicyclic hydrocarbon.  $R_5$  and  $R_6$  may form an alicyclic ring.]

[Chemical formula 61]

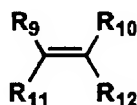


## 一般式(C1-1-3)



[X<sub>3</sub> and X<sub>4</sub> among a formula An aryl group, Express a heterocyclic machine and R<sub>7</sub> and R<sub>8</sub> Or an aryl group, a heterocyclic machine, an aryloxy group, an alkylthio group, an arylthio group, Or a halogen atom is expressed and R<sub>8</sub> either one of R<sub>7</sub> or expresses an aryloxy group, an alkylthio group, an arylthio group, or a halogen atom. ]  
[Chemical formula 62]

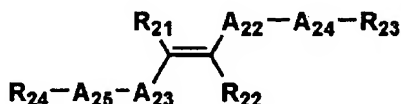
## 一般式(C1-2-1)



[R<sub>9</sub>, R<sub>10</sub>, R<sub>11</sub>, and R<sub>12</sub> express a hydrogen atom or a substituent among a formula, and at least one substituent of R<sub>9</sub>, R<sub>10</sub>, R<sub>11</sub>, and R<sub>12</sub> is denoted by the following general formula (2-2). ]General formula (2-2) \*-A<sub>20</sub>-A<sub>21</sub>-R<sub>20</sub>[A<sub>20</sub> and A<sub>21</sub> express the aromatic series ring of a monocyte, or heterocycle among a formula, R<sub>20</sub> expresses a hydrogen atom or a substituent, and \* expresses a binding site. ]

[Chemical formula 63]

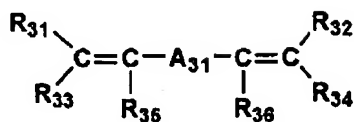
## 一般式(C1-2-3)



[A<sub>22</sub>, A<sub>23</sub>, A<sub>24</sub>, and A<sub>25</sub> express the aromatic series ring of a monocyte, or heterocycle among a formula, and R<sub>21</sub>, R<sub>22</sub>, R<sub>23</sub>, and R<sub>24</sub> express a hydrogen atom or a substituent. ]

[Chemical formula 64]

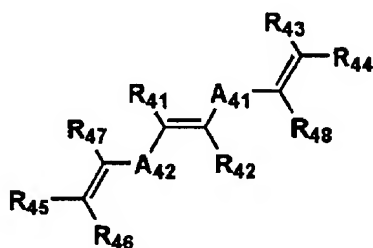
一般式(C1-3)



[A<sub>31</sub> expresses an aromatic series ring or heterocycle among a formula, and R<sub>31</sub>, R<sub>32</sub>, R<sub>33</sub>, R<sub>34</sub>, R<sub>35</sub>, and R<sub>36</sub> express a hydrogen atom or a substituent. ]

[Chemical formula 65]

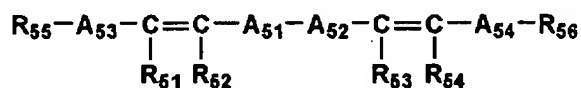
一般式(C1-4)



[A<sub>41</sub> and A<sub>42</sub> express an aromatic series ring or heterocycle among a formula, and R<sub>41</sub>, R<sub>42</sub>, R<sub>43</sub>, R<sub>44</sub>, R<sub>45</sub>, R<sub>46</sub>, R<sub>47</sub>, and R<sub>48</sub> express a hydrogen atom or a substituent. ]

[Chemical formula 66]

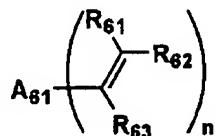
一般式(C1-5)



[A<sub>51</sub>, A<sub>52</sub>, A<sub>53</sub>, and A<sub>54</sub> express the aromatic series ring of a monocycle, or heterocycle among a formula, and R<sub>51</sub>, R<sub>52</sub>, R<sub>53</sub>, R<sub>54</sub>, R<sub>55</sub>, and R<sub>56</sub> express a hydrogen atom or a substituent. ]

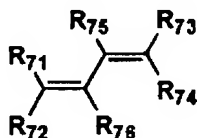
[Chemical formula 67]

## 一般式(C1-6)



[A<sub>61</sub> expresses an aromatic series machine or a heterocyclic machine among a formula, and R<sub>61</sub>, R<sub>62</sub>, and R<sub>63</sub> express a hydrogen atom or a substituent. n expresses the integer of 3-6. ]  
[Chemical formula 68]

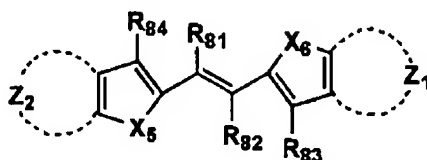
## 一般式(C1-7)



[R<sub>71</sub>, R<sub>72</sub>, R<sub>73</sub>, R<sub>74</sub>, R<sub>75</sub>, and R<sub>76</sub> express a hydrogen atom or a substituent among a formula. ]

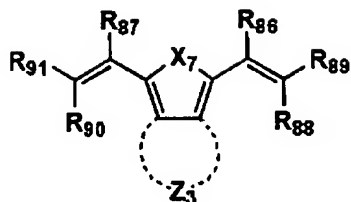
[Chemical formula 69]

## 一般式(C1-8-1)



[Z<sub>1</sub> and Z<sub>2</sub> are atomic groups which form a five-membered ring and a condensed ring among a formula, and X<sub>5</sub> and X<sub>6</sub> express -S-, -O-, and -NR<sub>85</sub>-. R<sub>81</sub>, R<sub>82</sub>, R<sub>83</sub>, R<sub>84</sub>, and R<sub>85</sub> express a hydrogen atom or a substituent. ]  
[Chemical formula 70]

## 一般式(C1-8-2)



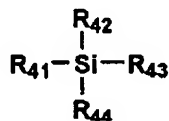
[ $Z_3$  is an atomic group which forms a five-membered ring and a condensed ring among a formula, and  $X_7$  expresses -S-, -O-, and -NR<sub>92</sub>-.  $R_{86}$ ,  $R_{87}$ ,  $R_{88}$ ,  $R_{89}$ ,  $R_{90}$ ,  $R_{91}$ , and  $R_{92}$  express a hydrogen atom or a substituent. ]  
[Chemical formula 71]

## 一般式(C2-1)



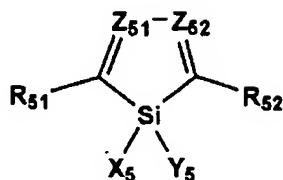
[ $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$ ,  $X_1$ , and  $Y_1$  express the substituent of a hydrogen atom or 1 value among a formula, and  $Z_1$  expresses CR<sub>15</sub>R<sub>16</sub>, O, S, and SiR<sub>17</sub>R<sub>18</sub>.  $R_{15}$ ,  $R_{16}$ ,  $R_{17}$ , and  $R_{18}$  express the substituent of a hydrogen atom or 1 value. ]  
[Chemical formula 72]

## 一般式(C2-4)



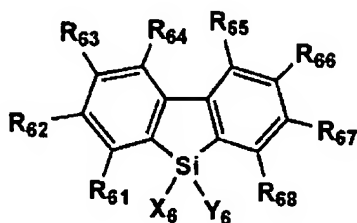
[ $R_{41}$ ,  $R_{42}$ ,  $R_{43}$ , and  $R_{44}$  are the substituents of 1 value among a formula, and at least one piece expresses an aromatic series machine.]  
[Chemical formula 73]

## 一般式(C2-5)



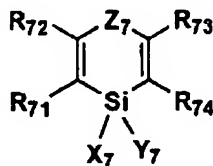
[R<sub>51</sub>, R<sub>52</sub>, X<sub>5</sub>, and Y<sub>5</sub> express the substituent of a hydrogen atom or 1 value among a formula.  
Z<sub>51</sub> and Z<sub>52</sub> express a nitrogen atom or CR<sub>53</sub>, and R<sub>53</sub> expresses the substituent of a  
hydrogen atom or 1 value. ]  
[Chemical formula 74]

## 一般式(C2-6)



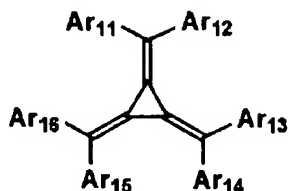
[R<sub>61</sub>, R<sub>62</sub>, R<sub>63</sub>, R<sub>64</sub>, R<sub>65</sub>, R<sub>66</sub>, R<sub>67</sub>, R<sub>68</sub>, X<sub>6</sub>, and Y<sub>6</sub> express the substituent of a hydrogen  
atom or 1 value among a formula. ]  
[Chemical formula 75]

## 一般式(C2-7)



[Among a formula, R<sub>71</sub>, R<sub>72</sub>, R<sub>73</sub>, R<sub>74</sub>, X<sub>7</sub>, and Y<sub>7</sub> express the substituent of a hydrogen atom  
or 1 value, and Z<sub>7</sub> expresses CR<sub>75</sub>R<sub>76</sub>, NR<sub>77</sub>, O, S, and SiR<sub>78</sub>R<sub>79</sub>. R<sub>75</sub>, R<sub>76</sub>, R<sub>77</sub>, R<sub>78</sub>, and  
R<sub>79</sub> express the substituent of a hydrogen atom or 1 value. ]  
[Chemical formula 76]

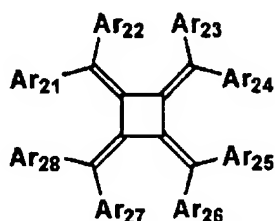
## 一般式(C3-1)



[In a general formula (C3-1), Ar<sub>11</sub> thru/or Ar<sub>16</sub> express the aromatic hydrocarbon machine or aromatic heterocycle machine which may have a substituent respectively. ]

[Chemical formula 77]

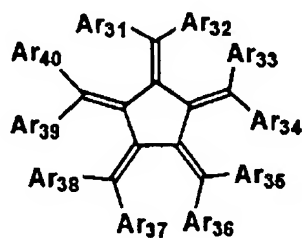
## 一般式(C3-2)



[In a general formula (C3-2), Ar<sub>21</sub> thru/or Ar<sub>28</sub> express the aromatic hydrocarbon machine or aromatic heterocycle machine which may have a substituent respectively. ]

[Chemical formula 78]

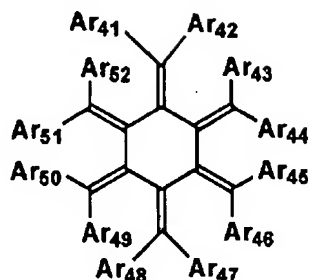
## 一般式(C3-3)



[In a general formula (C3-3), Ar<sub>31</sub> thru/or Ar<sub>40</sub> express the aromatic hydrocarbon machine or aromatic heterocycle machine which may have a substituent respectively. ]

[Chemical formula 79]

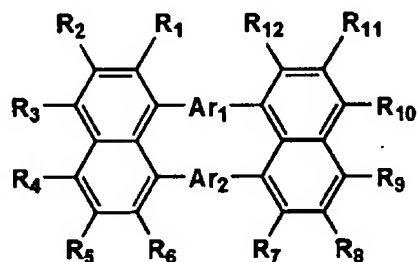
## 一般式(C3-4)



[In a general formula (C3-4), Ar<sub>41</sub> thru/or Ar<sub>52</sub> express the aromatic hydrocarbon machine or aromatic heterocycle machine which may have a substituent respectively. ]

[Chemical formula 80]

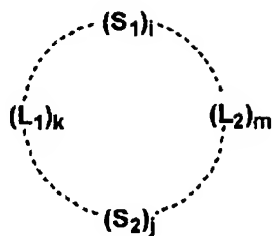
## 一般式(C4-1)



[Ar<sub>1</sub> and Ar<sub>2</sub> express a divalent aromatic hydrocarbon group or aromatic heterocycle group independently among a formula, respectively, and R<sub>1</sub> - R<sub>12</sub> express independently the alkyl group which is not replaced [ a hydrogen atom, substitution, or ], a cycloalkyl machine, an alkoxy group, or a halogen atom, respectively. ]

[Chemical formula 81]

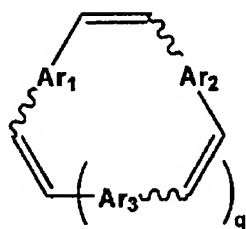
## 一般式(C5-1)



[In a general formula (C5-1),  $S_1$  and  $S_2$  express a styryl machine,  $L_1$  and  $L_2$  express a divalent connection machine,  $i$  and  $j$  express the integer of 0-6, and  $k$  and  $m$  express 0 and 1. ]

[Chemical formula 82]

## 一般式(C5-2)

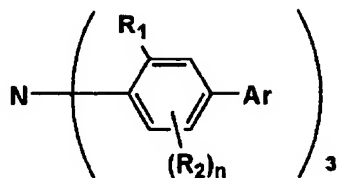


[In a general formula (C5-2),  $Ar_1$  -  $Ar_3$  express the divalent Ally Wren machine which is not replaced [ substitution or ], and  $q$  expresses the integer of 0-6. ]

[Chemical formula 83]



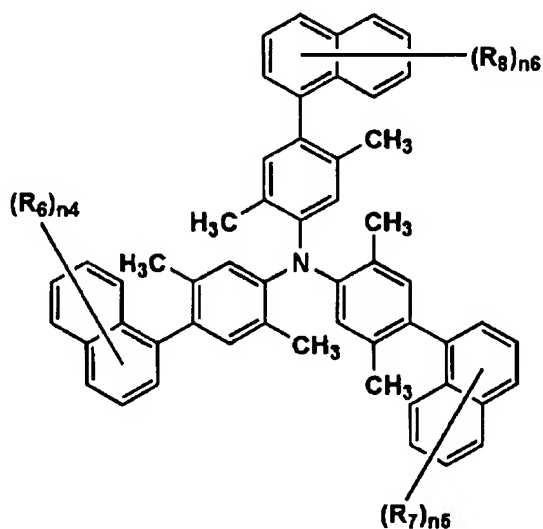
## 一般式(C6-I)



[ $\text{R}_1$  and  $\text{R}_2$  express a substituent respectively among a formula, Ar expresses the aromatic hydrocarbon ring which may have a substituent, or an aromatic heterocycle machine, and n expresses the integer of 0 to 3. ]

[Chemical formula 84]

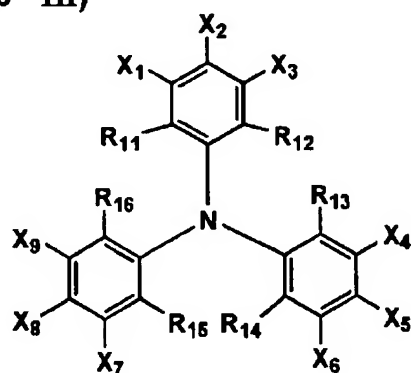
## 一般式(C6-II)



[Among a formula, one or more  $R_6$ ,  $R_7$ , and  $R_8$  express the substituent respectively chosen from an alkyl group, a cycloalkyl machine, an aryl group, halogen, an alkoxy group, an aryloxy group, and a heterocyclic machine, and  $n_4$ ,  $n_5$ , and  $n_6$  express the integer of 0 to 7 respectively. ]

[Chemical formula 85]

一般式(C6-III)

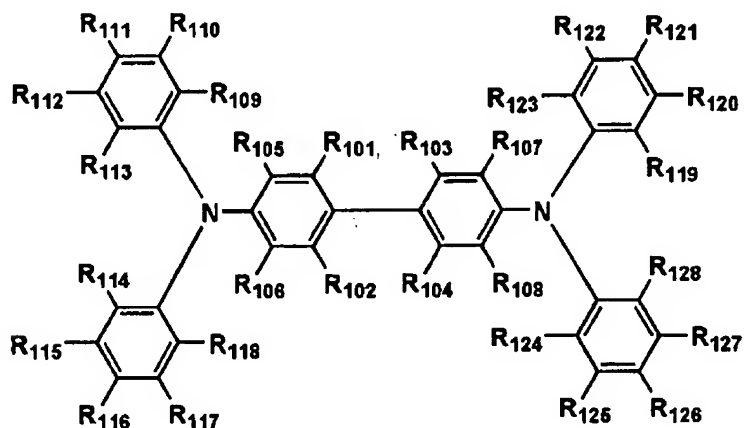


[Among a formula,  $R_{11}$ - $R_{16}$  and  $X_1$  -  $X_9$  may express a hydrogen atom or a substituent, and may differ from each other, respectively, or may be the same. However, the total value of each solid parameter  $Es_{R_{11}}$  - the  $Es_{R_{16}}$  value of  $R_{11}$  -  $R_{16}$  fills

$Es_{R_{11}} + Es_{R_{12}} + Es_{R_{13}} + Es_{R_{14}} + Es_{R_{15}} + Es_{R_{16}} \leq -2.0$ . ]

[Chemical formula 86]

一般式(C6-IV)

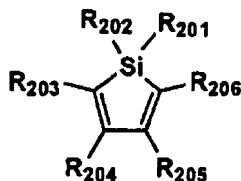


[ $R_{101}$  -  $R_{128}$  express a hydrogen atom or a substituent among a formula, respectively, and at

least one of  $R_{101}$  - the  $R_{104}$  expresses a substituent. ]

[Chemical formula 87]

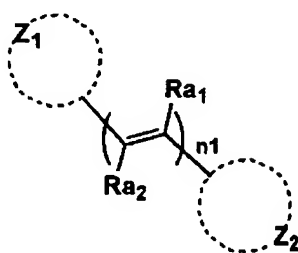
一般式(C6-V)



[ $R_{201}$  -  $R_{206}$  express a hydrogen atom or a substituent among a formula, respectively. ]

[Chemical formula 88]

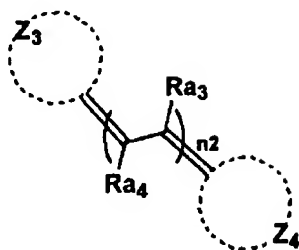
一般式(C7-1)



[ $Z_1$  and  $Z_2$  express an atomic group required to form a ring respectively among a formula,  $Ra_1$  and  $Ra_2$  are a hydrogen atom or a substituent, and  $n1$  is one or more integers. However,  $Z_2$  either one of  $Z_1$  or is a disconjugation ring of 7 - 9 member which is not replaced [ substitution or ], or eight conjugate membered-rings which have two or more hetero atoms. When  $Z_1$  and  $Z_2$  have a substituent, sigma of the substituent is less than more than -0.90 0.50. ]

[Chemical formula 89]

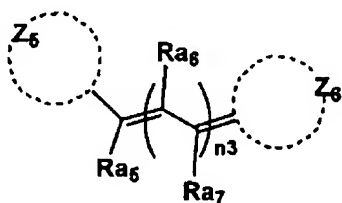
## 一般式(C7-2)



[ $Z_3$  and  $Z_4$  express an atomic group required to form a ring respectively among a formula,  $Ra_3$  and  $Ra_4$  are a hydrogen atom or a substituent, and  $n_2$  is one or more integers. However,  $Z_4$  either one of  $Z_3$  or is a disconjugation ring of 7 - 9 member which is not replaced [ substitution or ]. When  $Z_3$  and  $Z_4$  have a substituent, sigmap of the substituent is less than more than -0.90 0.50. ]

[Chemical formula 90]

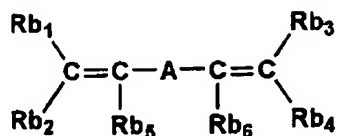
## 一般式(C7-3)



[ $Z_5$  and  $Z_6$  express an atomic group required to form a ring respectively among a formula,  $Ra_5$ ,  $Ra_6$ , and  $Ra_7$  are a hydrogen atom or a substituent, and  $n_3$  is an integer greater than or equal to 0. However,  $Z_6$  either one of  $Z_5$  or is a disconjugation ring of 7 - 9 member which is not replaced [ substitution or ], or eight conjugate membered-rings in which  $Z_5$  has two or more hetero atoms. When  $Z_5$  and  $Z_6$  have a substituent, sigmap of the substituent is less than more than - 0.90 0.50. ]

[Chemical formula 91]

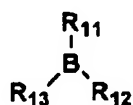
## 一般式(C7-4)



[A is a disconjugation ring of 7 - 9 member which is not replaced [ substitution or ], or eight conjugate membered-rings which have two or more hetero atoms among a formula. Rb<sub>1</sub>, Rb<sub>2</sub>, Rb<sub>3</sub>, Rb<sub>4</sub>, Rb<sub>5</sub>, and Rb<sub>6</sub> are a hydrogen atom or a substituent. When A has a substituent, sigma of the substituent is more than -0.90 and 0.50 or less. ]

[Chemical formula 92]

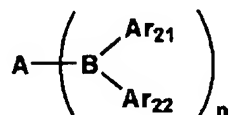
## 一般式(C8-1)



[B expresses a boron atom among a formula and R<sub>11</sub>, R<sub>12</sub>, and R<sub>13</sub> express the substituent of 1 value. However, at least one of R<sub>11</sub>, R<sub>12</sub>, and the R<sub>13</sub> expresses an aromatic series machine. ]

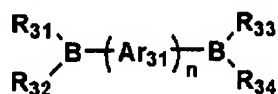
[Chemical formula 93]

## 一般式(C8-2)



[B expresses a boron atom among a formula,  $Ar_{21}$  and  $Ar_{22}$  express an aromatic series machine, A expresses the basis of 2 - 15 value, and n expresses the integer of 2-15. ]  
[Chemical formula 94]

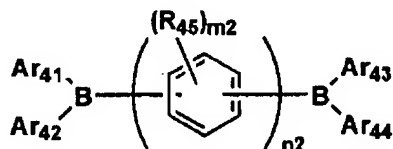
一般式(C8-3)



[B expresses a boron atom among a formula,  $Ar_{31}$  expresses the aromatic series machine of a monocycle, and  $R_{31}$ ,  $R_{32}$ ,  $R_{33}$ , and  $R_{34}$  express the substituent of 1 value. n expresses the integer of 1-5. ]

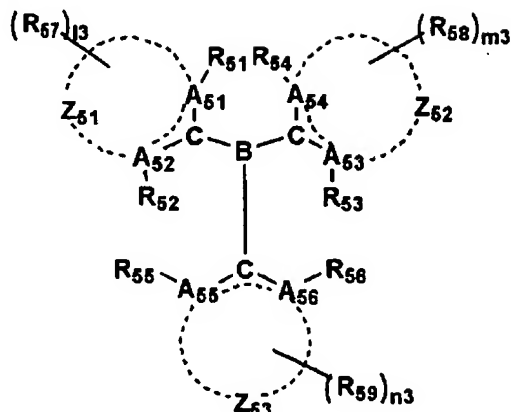
[Chemical formula 95]

一般式(C8-4)



[B expresses a boron atom among a formula,  $Ar_{41}$ ,  $Ar_{42}$ ,  $Ar_{43}$ , and  $Ar_{44}$  express an aromatic series machine, and  $R_{45}$  expresses the substituent of a hydrogen atom or 1 value.  $n_2$  expresses the integer of 2-5, and  $m_2$  expresses the integer of 0-4. ]  
[Chemical formula 96]

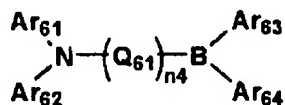
## 一般式(C8-5)



[B expresses a boron atom among a formula, and C expresses a carbon atom, and  $A_{51}$ ,  $A_{52}$ ,  $A_{53}$ ,  $A_{54}$ ,  $A_{55}$ , and  $A_{56}$  express a carbon atom or a nitrogen atom,  $Z_{51}$ ,  $Z_{52}$ , and  $Z_{53}$  express an atomic group required to form an aromatic series ring,  $R_{51}$ ,  $R_{52}$ ,  $R_{53}$ ,  $R_{54}$ ,  $R_{55}$ , and  $R_{56}$  express the substituent of a hydrogen atom or 1 value independently, respectively, and at least four of  $R_{51}$  -  $R_{56}$  express a substituent.  $R_{57}$ ,  $R_{58}$ , and  $R_{59}$  express the substituent of a hydrogen atom or 1 value independently, respectively, and l3, n3, and m3 express the integer of 0-7 independently, respectively. ]

[Chemical formula 97]

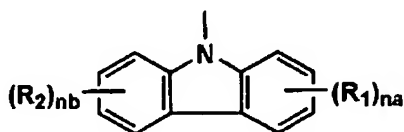
## 一般式(C8-6)



[ $Ar_{61}$ ,  $Ar_{62}$ ,  $Ar_{63}$ , and  $Ar_{64}$  express respectively the aromatic series machine which is not replaced [ substitution or ] independently among a formula,  $Q_{61}$  expresses an aromatic series machine, and n4 expresses the integer of 1-5. ]General formula (C9-1)  $R_{4-n}$ -Si-[L-A]<sub>n</sub>[R expresses hydrogen or a univalent substituent among a formula, L expresses a divalent connection machine, A expresses the carbazole derivative residue which has substituents other than a phenyl group in the active site of a carbazole ring, and n expresses 3 or 4. Two or more L and A may be the same respectively, or may differ from each other. ]General formula

(C10-1)  $X_1 - (A_1)_n$  [Among the formula,  $A_1$  is denoted by the following general formula (C10-2), may be the same or may differ.  $X_1$  is an annular connection machine of a non-aromatic system.  $n$  expresses the integer of 1-4. ]  
[Chemical formula 98]

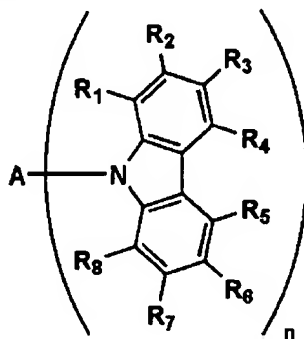
一般式(C10-2)



[ $R_1$  and  $R_2$  express a hydrogen atom or a substituent independently respectively among a formula, and  $na$  and  $nb$  express the integer of 0-4. ]

[Chemical formula 99]

一般式(C11-1)



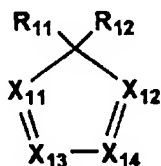
[ $A$  expresses among a formula the aromatic ring residue which may be replaced, and  $R_1 - R_8$  express a hydrogen atom or a substituent.  $R_1 - R_8$  are not hydrogen atoms simultaneously, and at least one has a substituent.  $n$  expresses a natural number, and when  $n$  is two or more, two or more carbazole derivative residues may be the same, or may differ. ]General formula (C12-1)  $R_{4-n} - Si - [L - A]_n$  [ $R$  expresses a hydrogen atom or a substituent among a formula, and  $L$  expresses the phenylene group which does not have a mere joint hand or substituent,  $A$  expresses carbazole residue, and when a binding site with  $L$  is only  $N$  of a carbazole skeleton, The alkyl group which may have a substituent in at least one or more substitution parts of



carbazole residue, respectively. (However, it is not t-butyl group when replacing by the 2nd place of a carbazole ring, and the 7th place), The phenyl group or amino group which has an alkyloxy machine, an aryloxy group, an alkylthio group, an arylthio group, an alkylamino group, an arylamino machine, a heterocyclic machine, or a substituent is replaced. When at least N of a carbazole skeleton is except, [ combination with L ] The branching alkyl group which may have a substituent, respectively, an alkyloxy machine, an aryloxy group, an alkylthio group, an arylthio group, an alkylamino group, the arylamino machine, the heterocyclic machine, the substitution phenyl group, or the amino group is replaced by N. n expresses the integer of 3 or 4. two or more A may be the same, or may differ. ]

[Chemical formula 100]

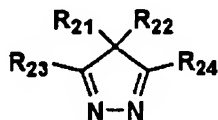
一般式(D1-1)



[X<sub>11</sub>, X<sub>12</sub>, X<sub>13</sub>, and X<sub>14</sub> express C-Ra or N among a formula, and at least one of X<sub>11</sub>, X<sub>12</sub>, X<sub>13</sub>, and the X<sub>14</sub> expresses N. Ra expresses a hydrogen atom or a substituent and R<sub>11</sub> and R<sub>12</sub> express a substituent. ]

[Chemical formula 101]

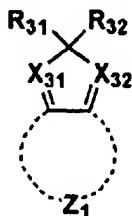
一般式(D1-2)



[R<sub>21</sub> and R<sub>22</sub> express a substituent among a formula. R<sub>23</sub> and R<sub>24</sub> express a hydrogen atom or a substituent. ]

[Chemical formula 102]

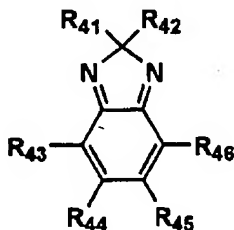
## 一般式(D1-3)



[ $R_{31}$  and  $R_{32}$  express a substituent among a formula.  $X_{31}$  and  $X_{32}$  express C-Rb or N, and at least one of  $X_{31}$  or the  $X_{32}$  expresses N.  $Z_1$  expresses an atomic group required to form a ring. Rb expresses a hydrogen atom or a substituent. ]

[Chemical formula 103]

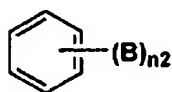
## 一般式(D1-4)



[ $R_{41}$  and  $R_{42}$  express a substituent among a formula.  $R_{43}$ ,  $R_{44}$ ,  $R_{45}$ , and  $R_{46}$  express a hydrogen atom or a substituent. ]General formula (D1-5)  $\text{Ar}-(\text{A})_{n1}$  [Ar expresses an aromatic series ring among a formula, A expresses disconjugation heterocycle, and  $n1$  expresses the integer of 2-6. ]

[Chemical formula 104]

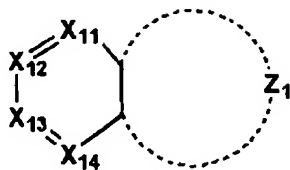
## 一般式(D1-6)



[B expresses disconjugation heterocycle among a formula and  $n2$  expresses the integer of 2-6. ]

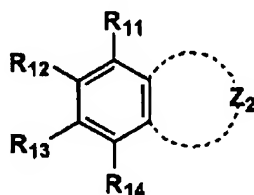
[Chemical formula 105]

## 一般式(D2-1)



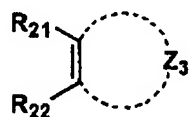
[ $X_{11}$  -  $X_{14}$  express C-Ra or a nitrogen atom respectively among a formula. Ra expresses a hydrogen atom or a substituent.  $Z_1$  expresses an atomic group required to form seven disconjugation membered-rings. ]  
[Chemical formula 106]

## 一般式(D2-2)



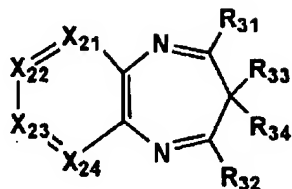
[ $R_{11}$  -  $R_{14}$  express a hydrogen atom or a substituent respectively among a formula.  $Z_2$  expresses an atomic group required to form seven disconjugation membered-rings. ]  
[Chemical formula 107]

## 一般式(D2-3)



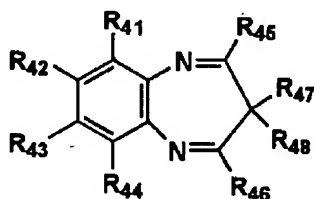
[As for  $R_{21}$  and  $R_{22}$ ,  $\sigma$  expresses more than -0.5 and 0.0 or less substituent respectively among a formula.  $Z_3$  expresses an atomic group required to form seven disconjugation membered-rings. ]  
[Chemical formula 108]

## 一般式(D2-4)



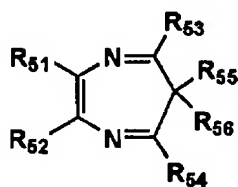
[ $X_{21}$  -  $X_{24}$  express C-Rb or a nitrogen atom respectively among a formula. Rb,  $R_{31}$  -  $R_{34}$  express a hydrogen atom or a substituent respectively. ]  
[Chemical formula 109]

## 一般式(D2-5)



[ $R_{41}$  -  $R_{48}$  express a hydrogen atom or a substituent respectively among a formula. ]  
[Chemical formula 110]

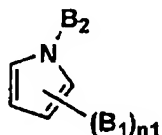
## 一般式(D2-6)



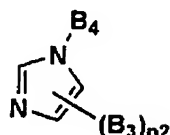
[As for  $R_{51}$  and  $R_{52}$ , sigma<sub>p</sub> expresses more than -0.5 and 0.0 or less substituent respectively among a formula.  $R_{53}$  -  $R_{56}$  express a hydrogen atom or a substituent respectively. ]General formula (D3-1)  $A_1$ -( $B_0$ ) -  $A_2$  [Among the formula,  $A_1$  and  $A_2$  are bases chosen from the partial structure denoted by (G) from the following general formulas (A), may be the same or may differ.  $B_0$  is a connection machine of the 2 values which have at least seven or more carbon atoms. ]

[Chemical formula 111]

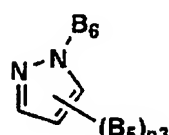
一般式(A)



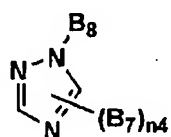
一般式(B)



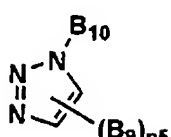
一般式(C)



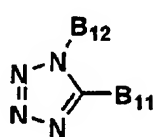
一般式(D)



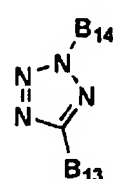
一般式(E)



一般式(F)



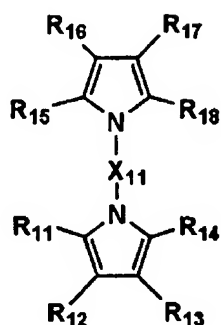
一般式(G)



[Among a formula, in a general formula (A), any one in  $B_1$  and  $B_2$  is equivalent to  $B_0$ , and others are the substituents of 1 value.  $n_1$  is an integer of 0 to 4. Among a formula, in a general formula (B), any one in  $B_3$  and  $B_4$  is equivalent to  $B_0$ , and others are the substituents of 1 value.  $n_2$  is an integer of 0 to 3. Among a formula, in a general formula (C), any one in  $B_5$  and  $B_6$  is equivalent to  $B_0$ , and others are the substituents of 1 value.  $n_3$  is an integer of 0 to 3. Among a formula, in a general formula (D), any one in  $B_7$  and  $B_8$  is equivalent to  $B_0$ , and others are the substituents of 1 value.  $n_4$  is an integer of 0 to 2. Among a formula, in a general formula (E), any one in  $B_9$  and  $B_{10}$  is equivalent to  $B_0$ , and others are the substituents of 1 value.  $n_5$  is an integer of 0 to 2. Among a formula, in a general formula (F), either  $B_{11}$  or  $B_{12}$  is equivalent to  $B_0$ , and one side is a substituent of 1 value. Among a formula, in a general formula (G), either  $B_{13}$  or  $B_{14}$  is equivalent to  $B_0$ , and one side is a substituent of 1 value. In general formula (A) - (E), the substituent of 1 value is condensed mutually, respectively and does not form a ring. ]

[Chemical formula 112]

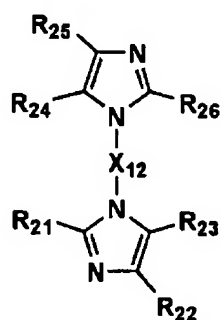
## 一般式(D3-2)



[X<sub>11</sub> expresses among a formula the basis of the 2 values which have at least 13 or more carbon atoms. R<sub>11</sub>, R<sub>12</sub>, R<sub>13</sub>, R<sub>14</sub>, R<sub>15</sub>, R<sub>16</sub>, R<sub>17</sub>, or R<sub>18</sub> expresses a hydrogen atom or a substituent. However, R<sub>11</sub>, R<sub>12</sub>, R<sub>13</sub>, R<sub>14</sub>, R<sub>15</sub>, R<sub>16</sub>, R<sub>17</sub>, or R<sub>18</sub> is condensed mutually, respectively, and does not form a ring. ]

[Chemical formula 113]

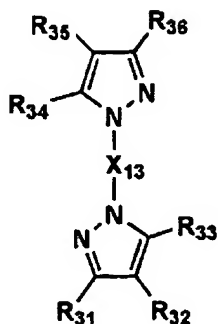
## 一般式(D3-3)



[X<sub>12</sub> expresses among a formula the basis of the 2 values which have at least 13 or more carbon atoms. R<sub>21</sub>, R<sub>22</sub>, R<sub>23</sub>, R<sub>24</sub>, R<sub>25</sub>, or R<sub>26</sub> expresses a hydrogen atom or a substituent. However, R<sub>21</sub>, R<sub>22</sub>, R<sub>23</sub>, R<sub>24</sub>, R<sub>25</sub>, or R<sub>26</sub> is condensed mutually, respectively, and does not form a ring. ]

[Chemical formula 114]

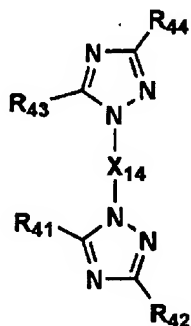
## 一般式(D3-4)



[ $X_{13}$  expresses the connection machine of 2 values among a formula.  $R_{31}$ ,  $R_{32}$ ,  $R_{33}$ ,  $R_{34}$ ,  $R_{35}$ , or  $R_{36}$  expresses a hydrogen atom or a substituent. However,  $R_{31}$ ,  $R_{32}$ ,  $R_{33}$ ,  $R_{34}$ ,  $R_{35}$ , or  $R_{36}$  is condensed mutually, respectively, and does not form a ring. ]

[Chemical formula 115]

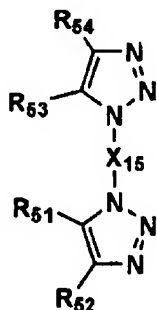
## 一般式(D3-5)



[ $X_{14}$  expresses the basis of 2 values among a formula.  $R_{41}$ ,  $R_{42}$ ,  $R_{43}$ , or  $R_{44}$  expresses a hydrogen atom or a substituent. However,  $R_{41}$ ,  $R_{42}$ ,  $R_{43}$ , or  $R_{44}$  is condensed mutually, respectively, and does not form a ring. ]

[Chemical formula 116]

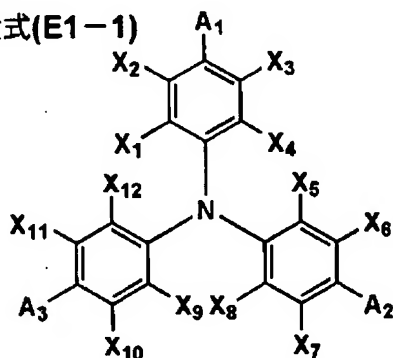
## 一般式(D3-6)



[ $X_{15}$  expresses the basis of 2 values among a formula.  $R_{51}$ ,  $R_{52}$ ,  $R_{53}$ , or  $R_{54}$  expresses a hydrogen atom or a substituent. However,  $R_{51}$ ,  $R_{52}$ ,  $R_{53}$ , or  $R_{54}$  is condensed mutually, respectively, and does not form a ring. ]

[Chemical formula 117]

## 一般式(E1-1)

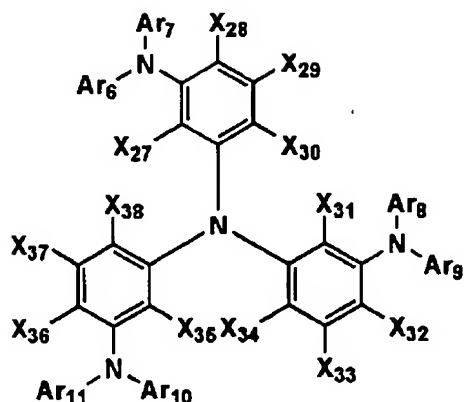


[Among a formula,  $X_1 - X_{12}$  express a hydrogen atom or a substituent, it may differ respectively, or may be the same and at least one of  $X_1$ ,  $X_4$ ,  $X_5$ ,  $X_8$ ,  $X_9$ , and  $X_{12}$  expresses a substituent.  $A_1 - A_3$  may express the aromatic hydrocarbon machine which is not replaced [ substitution or ], and may differ from each other respectively, or may be the same. ]

[Chemical formula 118]



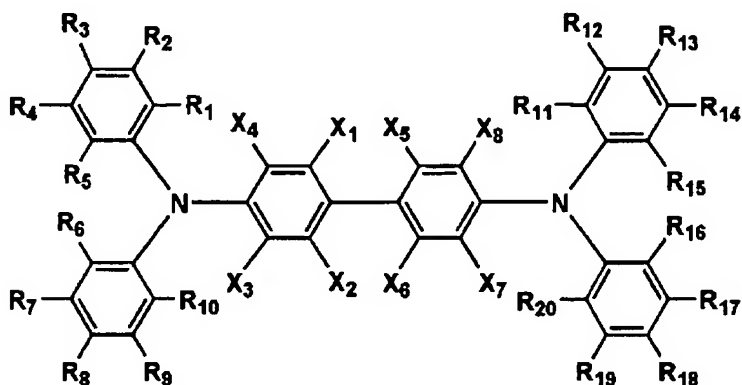
## 一般式(E1-5)



[Among a formula,  $X_{27} - X_{38}$  may express a hydrogen atom or a substituent, and may differ from each other respectively, or may be the same.  $Ar_6 - Ar_{11}$  may express the aromatic hydrocarbon machine which is not replaced [ substitution or ], and may differ from each other respectively, or may be the same. ]

[Chemical formula 119]

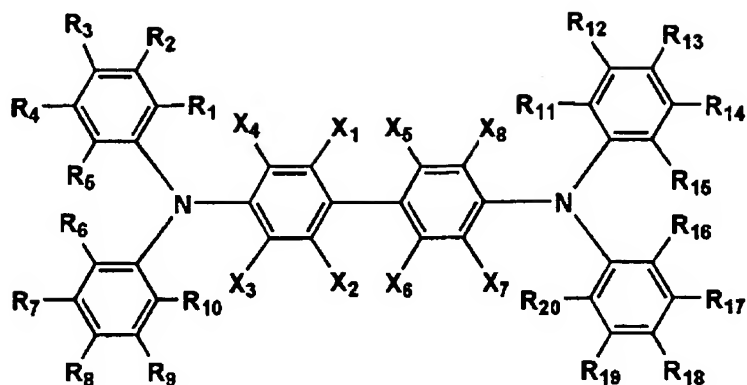
## 一般式(E2-1)



[ $X_1$  thru/or  $X_8$  and  $R_1$  thru/or  $R_{20}$  express a hydrogen atom or a substituent respectively among a formula, it may differ respectively, or may be the same and at least one of  $X_1$ ,  $X_2$ ,  $X_5$ , and  $X_6$  expresses a substituent. ]

[Chemical formula 120]

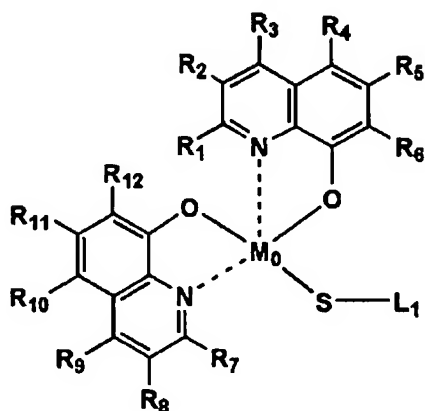
## 一般式(E2-5)



[ $X_1$  thru/or  $X_8$  and  $R_1$  thru/or  $R_{20}$  express a hydrogen atom or a substituent respectively among a formula, It may differ respectively, or may be the same and the total value ( $EsX_1 + EsX_2 + EsX_5 + EsX_6$ ) of each solid parameter  $EsX_1$  of  $X_1$ ,  $X_2$ ,  $X_5$ , and  $X_6$ ,  $EsX_2$ ,  $EsX_5$ , and  $EsX_6$  is less than -2.5. ]

[Chemical formula 121]

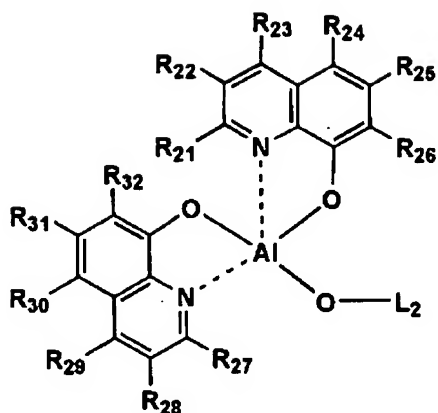
## 一般式(F1-1)



[ $M_0$  expresses indium or gallium among a formula,  $R_1 - R_{12}$  express a hydrogen atom or a substituent, and  $L_1$  expresses a hydrogen atom or a substituent. ]

[Chemical formula 122]

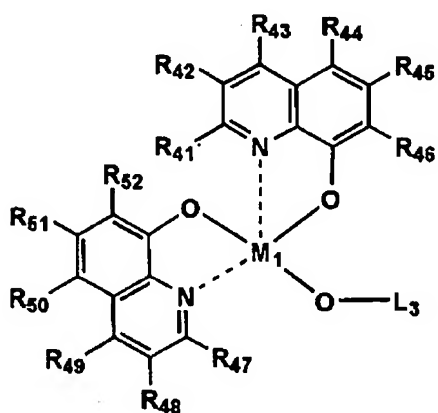
## 一般式(F1-2)



[ $R_{21}$  -  $R_{32}$  express a hydrogen atom or a substituent among a formula, and  $L_2$  expresses a heterocyclic machine. ]

[Chemical formula 123]

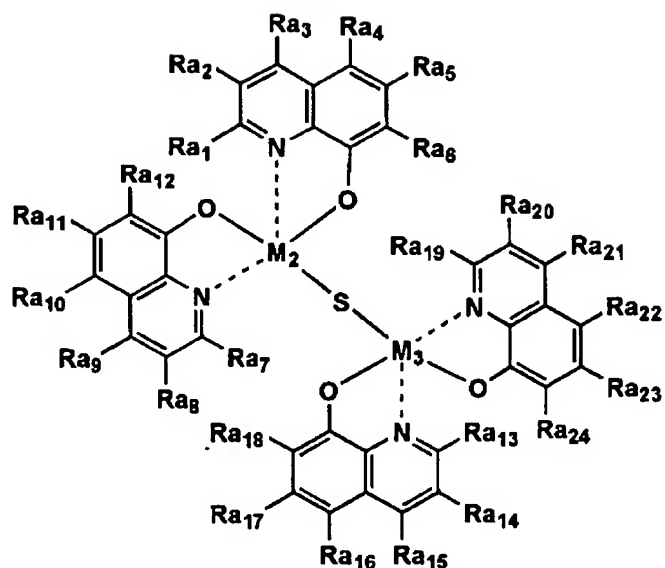
## 一般式(F1-3)



[ $M_1$  expresses gallium and indium among a formula,  $R_{41}$  -  $R_{52}$  express a hydrogen atom or a substituent, and  $L_3$  expresses a heterocyclic machine. ]

[Chemical formula 124]

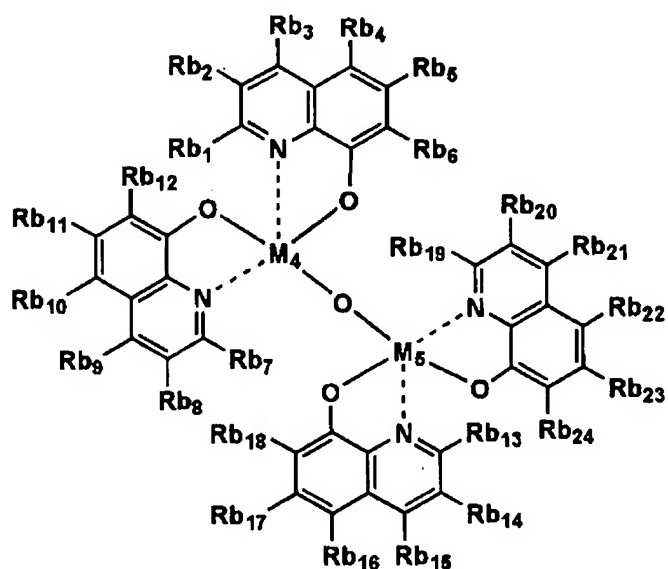
## 一般式(F1-4)



[ $M_2$  and  $M_3$  express aluminum, indium, or gallium among a formula, and  $Ra_1$  -  $Ra_{24}$  express a hydrogen atom or a substituent. ]

[Chemical formula 125]

## 一般式(F1-5)



[ $M_4$  and  $M_5$  express indium or gallium among a formula, and  $Rb_1$  -  $Rb_{24}$  express a hydrogen atom or a substituent. ]

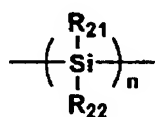
[Claim 2] A white luminescence organic electroluminescence element characterized by the following.

Polysilane which has a structure unit expressed with the following general formula (C2-2) or (C2-3) to at least one layer.

And luminescence is real white.

[Chemical formula 126]

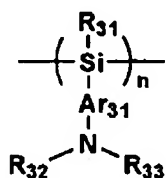
一般式(C2-2)



[R<sub>21</sub> and R<sub>22</sub> express an alkyl group, an aromatic series machine, an alkoxy group, or an aryloxy group independently among a formula, respectively, and n expresses an integer greater than or equal to 3. ]

[Chemical formula 127]

一般式(C2-3)



[R<sub>31</sub> expresses an alkyl group, an aromatic series machine, an alkoxy group, or an aryloxy group among a formula, R<sub>32</sub> and R<sub>33</sub> express an alkyl group and an aromatic series machine independently, respectively, Ar<sub>31</sub> expresses the Ally Wren machine, and n expresses an integer greater than or equal to 3. ]

[Claim 3] A white luminescence organic electroluminescence element characterized by the following.

A fluorogenic compound whose ratio (N/C) of the number of nitrogen atoms in a molecule to

the number of carbon atoms is 0.05 or less [ 0 or more ] at at least one layer.  
And luminescence is real white.

[Claim 4]A white luminescence organic electroluminescence element characterized by the following.

A fluorogenic compound whose ratios [ as opposed to / as opposed to / in a fluorescence maximum wavelength / at least one layer / total of a hydrogen atom and a fluorine atom in 500-2000, and a molecule in 415 nm or less and a molecular weight ] (F/(H+F)) of a fluorine atom are 0-0.9.

And luminescence is real white.

[Claim 5]The above, general formula (A1-1) - (A1-6) general formula (A2-1) - (A2-7), A general formula (B1-1), a general formula (B1-6), a general formula (B1-11), General formula (B1-13), general formula (B2-1) - (B2-8) general formula (B3-1) - (B3-2), General formula (B4-1), general formula (B5-1) - (B5-3) general formula (B6-1) - (B6-2), A general formula (B7-1), a general formula (B8-1), a general formula (B9-1), a general formula (B10-1), A general formula (B11-1) - (B11-3) a general formula (C1-1-1), (C1-1-2), (C1-1-3), a general formula (C1-2-1), (C1-2-3), A general formula (C1-3) - (C1-7) a general formula (C1-8-1), (C1-8-2), General formula (C2-1), general formula (C2-4) - (C2-7) general formula (C3-1) - (C3-4), General formula (C4-1), general formula (C5-1) - (C5-2) general formula (C6-I) - (C6-V), General formula (C7-1) - (C7-4) general formula (C8-1) - (C8-6) general formula (C9-1), general formula (C10-1), general formula (C11-1), general formula (C12-1), and general formula (D1-1) - (D1-6), General formula (D2-1) - (D2-6) general formula (D3-1) - (D3-6), [ at least one sort of compounds chosen from \*\*\*\*\* denoted by general formula (E1-1), general formula (E1-5), a general formula (E2-1), and (E2-5), respectively ] The white luminescence organic electroluminescence element according to claim 1 containing at least in any one layer of a luminous layer, an electron hole transportation layer, and the electron transport layer.

[Claim 6]The above, general formula (A1-1) - (A1-6) general formula (A2-1) - (A2-7), A general formula (B1-1), a general formula (B1-6), a general formula (B1-11), A general formula (B1-13), a general formula (B2-1) - (B2-8) a general formula (B3-1), (B3-2), general formula (B4-1), and general formula (B5-1) - (B5-3), A general formula (B6-1), (B6-2), a general formula

(B7-1), a general formula (B8-1), General formula (B9-1), general formula (B10-1), and general formula (B11-1) - (B11-3), A general formula (C1-1-1), (C1-1-2), (C1-1-3), a general formula (C1-2-1), (C1-2-3), a general formula (C1-3) - (C1-7) a general formula (C1-8-1), (C1-8-2), general formula (C2-1), and general formula (C2-4) - (C2-7), A general formula (C3-1) - (C3-4) a general formula (C4-1), a general formula (C5-1), (C5-2), general formula (C6-I) - (C6-V) general formula (C7-1) - (C7-4) general formula (C8-1) - (C8-6) general formula (C9-1), general formula (C10-1), general formula (C11-1), general formula (C12-1), and general formula (D1-1) - (D1-6), [ at least one sort of compounds chosen from a compound denoted by general formula (D2-1) - (D2-6) and general formula (D3-1) - (D3-6), respectively ] The white luminescence organic electroluminescence element according to claim 1 or 5 containing in any one layer of a luminous layer and the electron transport layer at least.

[Claim 7]The above, general formula (A1-1) - (A1-6) general formula (A2-1) - (A2-7), A general formula (B1-1), a general formula (B1-6), a general formula (B1-11), A general formula (B1-13), a general formula (B2-1) - (B2-8) a general formula (B3-1), (B3-2), general formula (B4-1), and general formula (B5-1) - (B5-3), A general formula (B6-1), (B6-2), a general formula (B7-1), a general formula (B8-1), General formula (B9-1), general formula (B10-1), and general formula (B11-1) - (B11-3), A general formula (C1-1-1), (C1-1-2), (C1-1-3), a general formula (C1-2-1), A general formula (C1-2-3), a general formula (C1-3) - (C1-7) a general formula (C1-8-1), (C1-8-2), general formula (C2-1), and general formula (C2-4) - (C2-7), A general formula (C3-1) - (C3-4) a general formula (C4-1), a general formula (C5-1), (C5-2), general formula (C6-I) - (C6-V) general formula (C7-1) - (C7-4) general formula (C8-1) - (C8-6) general formula (C9-1), general formula (C10-1), general formula (C11-1), general formula (C12-1), and general formula (D1-1) - (D1-6), The white luminescence organic electroluminescence element according to claim 1, 5, or 6 containing at least at least one sort of compounds chosen from a compound denoted by general formula (D2-1) - (D2-6) general formula (D3-1) - (D3-6), respectively in a luminous layer.

[Claim 8]Said general formula (C2-2), polysilane which has a structure unit denoted by (C2-3), A fluorogenic compound whose ratio (N/C) of the number of nitrogen atoms in said molecule to the number of carbon atoms is 0.05 or less [ 0 or more ], A ratio [ as opposed to / as opposed to / in a fluorescence maximum wavelength / 415 nm or less / total of a hydrogen atom and a fluorine atom in 500-2000, and a molecule in a molecular weight ] (F/(H+F)) of a fluorine atom at least at least one sort of compounds chosen from a fluorogenic compound which are 0-0.9 Or a luminous layer, an electron hole transportation layer, A white luminescence organic

electroluminescence element containing in any one layer of the electron transport layer.

[Claim 9] Polysilane which has a structure unit denoted by said general formula (C2-2) or (C2-3), A fluorogenic compound whose ratio (N/C) of the number of nitrogen atoms in said molecule to the number of carbon atoms is 0.05 or less [ 0 or more ], A ratio [ as opposed to / as opposed to / in a fluorescence maximum wavelength / 415 nm or less / total of a hydrogen atom and a fluorine atom in 500-2000, and a molecule in a molecular weight ] (F/(H+F)) of a fluorine atom at least one sort of compounds chosen from a fluorogenic compound which are 0-0.9 Or a luminous layer, The white luminescence organic electroluminescence element according to claim 8 containing in any one layer of the electron transport layer.

[Claim 10] Polysilane which has a structure unit denoted by said general formula (C2-2) or (C2-3), A fluorogenic compound whose ratio (N/C) of the number of nitrogen atoms in said molecule to the number of carbon atoms is 0.05 or less [ 0 or more ], [ or at least one sort of compounds chosen from a fluorogenic compound whose ratios / as opposed to / as opposed to / in a fluorescence maximum wavelength / 415 nm or less / total of a hydrogen atom and a fluorine atom in 500-2000, and a molecule in a molecular weight / (F/(H+F)) of a fluorine atom are 0-0.9 ] The white luminescence organic electroluminescence element according to claim 8 containing in a luminous layer.

[Claim 11] The white luminescence organic electroluminescence element according to claim 1 containing at least one sort chosen from a compound denoted by the above, a general formula (E1-1), general formula (E1-5), general formula (E2-1), and a general formula (E2-5), respectively in an electron hole transportation layer.

[Claim 12] The above, general formula (D1-1) - (D1-6) general formula (D2-1) - (D2-6), A white luminescence organic electroluminescence element containing at least one sort chosen from a compound denoted by general formula (D3-1) - (D3-6) and general formula (F1-1) - (F1-5), respectively in an electron hole prevention layer.

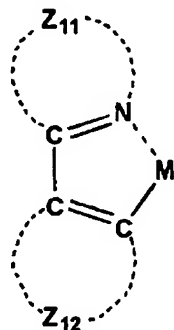
[Claim 13] A white luminescence organic electroluminescence element containing in a luminous layer by using as a phosphorescence dopant at least one sort chosen from a compound



denoted by following general formula general formula (G1-1) - (G1-5), respectively.

[Chemical formula 128]

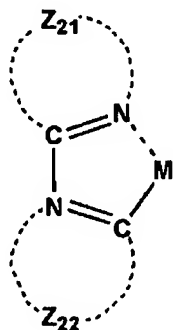
一般式(G1-1)



[C expresses a carbon atom among a formula, N expresses a nitrogen atom,  $Z_{11}$  expresses an atomic group required to form an aromatic series ring with a carbon atom and a nitrogen atom,  $Z_{12}$  expresses an atomic group required to form a non-aromatic ring with a carbon atom, and M expresses metal. ]

[Chemical formula 129]

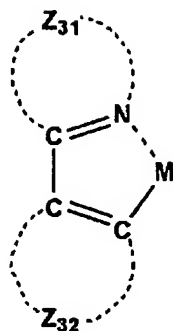
一般式(G1-2)



[C expresses a carbon atom among a formula, N expresses a nitrogen atom,  $Z_{21}$  and  $Z_{22}$  express an atomic group required to form an aromatic ring with a carbon atom and a nitrogen atom, respectively, and M expresses metal. ]

[Chemical formula 130]

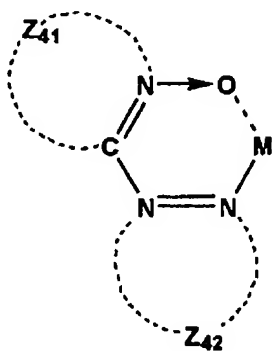
## 一般式(G1-3)



[C expresses a carbon atom among a formula, N expresses a nitrogen atom, and  $Z_{31}$  expresses an atomic group required to form an aromatic series ring with a carbon atom and a nitrogen atom,  $Z_{32}$  expresses an atomic group constituted with a carbon atom required to form 5 member aromatic series ring with a carbon atom, a nitrogen atom, or an oxygen atom, and M expresses metal. ]

[Chemical formula 131]

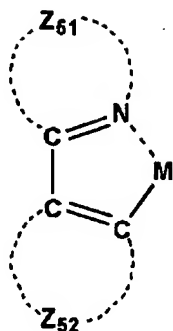
## 一般式(G1-4)



[C expresses a carbon atom among a formula, N expresses a nitrogen atom,  $Z_{41}$  expresses an atomic group required to form a ring with a carbon atom and a nitrogen atom,  $Z_{42}$  expresses an atomic group required to form a ring with a carbon atom, and M expresses metal. ]

[Chemical formula 132]

## 一般式(G1-5)



[C expresses a carbon atom among a formula, N expresses a nitrogen atom,  $Z_{51}$  expresses an atomic group required to form an aromatic series ring with a carbon atom and a nitrogen atom,  $Z_{52}$  expresses the atomic group which forms an AZUREN ring with a carbon atom, and M expresses metal. ]

[Claim 14]The white luminescence organic electroluminescence element according to claim 1 to 13, wherein white luminescence contains an optic element which originates in phosphorescence emission at least.

[Claim 15]A lighting installation which possesses a white luminescence organic electroluminescence element of a description in any 1 paragraph of Claims 1-14, and is characterized by things.

[Claim 16]A display device which possesses a white luminescence organic electroluminescence element of a description in any 1 paragraph of Claims 1-14, and is characterized by things.

[Claim 17]A display device which possesses a white luminescence organic electroluminescence element and a displaying means of a description in any 1 paragraph of Claims 1-14, and is characterized by things.

[Claim 18]The display device according to claim 17, wherein a displaying means is a liquid crystal display element.

[Claim 19]Electrical appliances which possess a white luminescence organic electroluminescence element of a description in any 1 paragraph of Claims 1-14, and are characterized by things.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to a lighting installation, a display device, etc. possessing a white luminescence organic electroluminescence element and this white luminescence organic electroluminescence element.

[0002]

[Description of the Prior Art]The organic electroluminescence element using organic materials as a photogen did not result in utilization research with it, although various examination had been performed. [ very bad luminous efficiency and ] [ full-fledged ] However, the organic electroluminescence which will have the lamination structure of the functional discrete type which divided organic materials into two-layer [ of a hole transportation layer and a luminous layer ] by C.W.Tang and others of Kodak in 1987 is proposed, In this thing, it became clear that the high luminescence luminosity more than  $1000 \text{ cd/m}^2$  is obtained in spite of the low voltage not more than 10V. And an organic electroluminescence element begins to attract attention after this, and active research came to be done.

[0003]As a result of making such research and development, now, [ an organic electroluminescence element ] Full-color-izing and white luminescence from blue to red are possible by attaining field luminescence high-intensity [ about  $100 - 100000 \text{ cd/m}^2$  ] by the

about [ 10V ] low voltage, and choosing the kind of fluorescent substance. Although what has luminous efficiency and the life characteristic enough about blue or green material has been developed, while the further improvement in luminous efficiency or a life is desired in red material and a white light emitting element, many reports are made also in the white light emitting element until now.

[0004]There is a method of generally using two waves of coloring of the \*\*\*\* relation between the method of using R, G, and luminescence from B3 wave, blue, yellow or bluish green, and \*\*, as a method of obtaining white luminescence.

[0005]In the case of a three-wave method, by a low-molecular system, using the carrier block layer of p-EtTAZ (bird azole derivative) with R, G, and B three-wave white luminescence, It is reported using PVK (polyvinyl carbazole) of a polymer system, the electronic transportation agent PBD (oxadiazole derivative), and four kinds of pigments that efficient white luminescence is possible.

[0006]Also in a two-wave method, the white element of the shoes which want to attain high-intensity is reported.

[0007]These white elements are further made efficient and the life[ super-]-ized element is reported to JP,2002-164170,A etc.

[0008]However, these still have the low luminosity efficiency characteristic, and it cannot be said in the life characteristic that it is enough from a viewpoint of utilization, Since actions, such as efficiency, a life (degradation), etc. of each luminescence substance, differ, when it sees on the level of a light emitting element, usually it comprises an aggregate of the separate element which emits light in red, green, blue, etc., respectively.

Therefore, each element must be arranged in the shape of an array, and there was also a problem that production processes became complicated.

[0009]When application, the application to the Lighting Sub-Division use of a white light emitting element, an another side type DIZU play (liquid crystal display), for example, LCD etc., etc., is considered, that the element itself emits light white or that production processes are easy and the further low power consumption, and a raise in luminous efficiency are required.

[0010]Although quantum \*\*\*\* of the fluorescence of an organic luminescent material is raised for efficient-izing and many approaches which raise quantum efficiency, approaches which improve light emitting element structure and realize low-voltage drive-ization of an element, etc. have been conventionally considered in an organic electroluminescence element, a report is carried out for the organic EL device using phosphorescence luminescence from an excitation Mie paragraph from Princeton University in recent years (M. -- A.Baldo et al. --) [ nature and ] Research of the material which shows phosphorescence at 395 volumes, 151-154 pages (1998), and room temperature is becoming active (for example, M.A.Baldo et al., nature, 403 volumes, No. 17, 750-753 pages (2000), US,6,097,147,B, etc.).

[0011]Conventionally, luminescence from a little fluorescent substances doped is luminescence from an excitation single paragraph.

Since the generation probability of a luminescent excitation kind being 25% since the generation ratio of a single paragraph exciton and a triplet exciton is 1:3, and the extraction efficiency of light are about 20% when using luminescence from an excitation single paragraph, the limit of external extraction quantum efficiency ( $\eta_{\text{ext}}$ ) is made into 5%, but. Since the maximum of internal quantum efficiency will be 100% if an excitation Mie paragraph is used, compared with the case where luminescence from an old excitation single paragraph is used, luminous efficiency will be a maximum of 4 times theoretically, performance almost equivalent to a cold cathode pipe is obtained, and it can apply to Lighting Sub-Division, and is observed.

[0012]As for a host, when using a phosphorescence compound as a dopant, it is needless to say that it is required for a field [ shortwave / maximum wavelength / of a phosphorescence compound / luminescence ] to have a luminescence maximum wavelength, but it turns out that there are conditions which should be fulfilled.

In The 10 th International Workshop on Inorganic and Organic Electroluminescence (EL'00,

Hamamatsu), some reports are made about the phosphorescence compound.

For example, Ikai and others uses the compound of hole transportability as hosts of a phosphorescence compound. As a host of a phosphorescence compound, M.E.Tompson and others dopes a new iridium complex to these, and uses various electron-transport-property materials for them. Tsutsui and others has acquired high luminous efficiency by introducing a hole block layer.

[0013]An organic electroluminescence element consists of this inventions using two or more dopants or host compounds.

Therefore, the white luminescence organic electroluminescence element which was excellent in the degree of whiteness and luminescence luminosity of a luminescence color, and has improved the aforementioned faults, such as a luminescence life (color gap), is made profitably like.

[0014]

[Patent documents 1] JP,2002-164170,A

[0015]

[Problem to be solved by the invention]This invention is made in view of the above-mentioned point, and it aims at providing the lighting installation, the display device, or electrical appliances possessing an efficient, long lasting, and uniform white luminescence organic electroluminescence element and this element.

[0016]

[Means for solving problem]Above-mentioned SUBJECT of this invention is attained by the

following means.

[0017]1. White luminescence organic electroluminescence element which contains at least one sort of compounds chosen from compound expressed with said general formula (A1-1) - (F1-5) to at least one layer, respectively, and is characterized by luminescence being real white.

[0018]2. White luminescence organic electroluminescence element which contains polysilane which has structure unit expressed with said general formula (C2-2) or (C2-3) to at least one layer, and is characterized by luminescence being real white.

[0019]3. White luminescence organic electroluminescence element which ratio (N/C) of number of nitrogen atoms in molecule to number of carbon atoms contains or more 0 fluorogenic compound which is 0.05 or less in at least one layer, and is characterized by luminescence being real white.

[0020]4. Ratio [ as opposed to / as opposed to / in fluorescence maximum wavelength / at least one layer / total of hydrogen atom and fluorine atom in 500-2000, and molecule in 415 nm or less and molecular weight ]  $(F/(H+F))$  of fluorine atom contains fluorogenic compound which are 0-0.9, And a white luminescence organic electroluminescence element, wherein luminescence is real white.

[0021]5. Above, general formula (A1-1) - (A1-6) general formula (A2-1) - (A2-7), A general formula (B1-1), a general formula (B1-6), a general formula (B1-11), General formula (B1-13), general formula (B-2-1) - (B-2-8) general formula (B3-1) - (B3-2), General formula (B4-1), general formula (B5-1) - (B5-3) general formula (B6-1) - (B6-2), A general formula (B7-1), a general formula (B8-1), a general formula (B9-1), a general formula (B10-1), A general formula (B11-1) - (B11-3) a general formula (C1-1-1), (C1-1-2), (C1-1-3), a general formula (C1-2-1), (C1-2-3), A general formula (C1-3) - (C1-7) a general formula (C1-8-1), (C1-8-2), General formula (C2-1), general formula (C2-4) - (C2-7) general formula (C3-1) - (C3-4), General formula (C4-1), general formula (C5-1) - (C5-2) general formula (C6-I) - (C6-V), General formula (C7-1) - (C7-4) general formula (C8-1) - (C8-6) general formula (C9-1), general formula (C10-1), general formula (C11-1), general formula (C12-1), and general formula (D1-1)



- (D1-6), General formula (D2-1) - (D2-6) general formula (D3-1) - (D3-6), [ at least one sort of compounds chosen from \*\*\*\*\* denoted by the general formula (E1-1), the general formula (E1-5), a general formula (E2-1), and (E2-5), respectively ] A white luminescence organic electroluminescence element given in said 1 containing at least in any one layer of a luminous layer, an electron hole transportation layer, and the electron transport layer.

[0022]6. Above, general formula (A1-1) - (A1-6) general formula (A2-1) - (A2-7), A general formula (B1-1), a general formula (B1-6), a general formula (B1-11), A general formula (B1-13), a general formula (B2-1) - (B2-8) a general formula (B3-1), (B3-2), general formula (B4-1), and general formula (B5-1) - (B5-3), A general formula (B6-1), (B6-2), a general formula (B7-1), a general formula (B8-1), General formula (B9-1), general formula (B10-1), and general formula (B11-1) - (B11-3), A general formula (C1-1-1), (C1-1-2), (C1-1-3), a general formula (C1-2-1), (C1-2-3), a general formula (C1-3) - (C1-7) a general formula (C1-8-1), (C1-8-2), general formula (C2-1), and general formula (C2-4) - (C2-7), A general formula (C3-1) - (C3-4) a general formula (C4-1), a general formula (C5-1), (C5-2), general formula (C6-I) - (C6-V) . general formula (C7-1) - (C7-4) general formula (C8-1) - (C8-6) general formula (C9-1), general formula (C10-1), general formula (C11-1), general formula (C12-1), and general formula (D1-1) - (D1-6), [ at least one sort of compounds chosen from the compound denoted by general formula (D2-1) - (D2-6) and general formula (D3-1) - (D3-6), respectively ] A white luminescence organic electroluminescence element given in said 1 or 5 containing in any one layer of a luminous layer and the electron transport layer at least.

[0023]7. The above, general formula (A1-1) - (A1-6) general formula (A2-1) - (A2-7), A general formula (B1-1), a general formula (B1-6), a general formula (B1-11), A general formula (B1-13), a general formula (B2-1) - (B2-8) a general formula (B3-1), (B3-2), general formula (B4-1), and general formula (B5-1) - (B5-3), A general formula (B6-1), (B6-2), a general formula (B7-1), a general formula (B8-1), General formula (B9-1), general formula (B10-1), and general formula (B11-1) - (B11-3), A general formula (C1-1-1), (C1-1-2), (C1-1-3), a general formula (C1-2-1), A general formula (C1-2-3), a general formula (C1-3) - (C1-7) a general formula (C1-8-1), (C1-8-2), general formula (C2-1), and general formula (C2-4) - (C2-7), A general formula (C3-1) - (C3-4) a general formula (C4-1), a general formula (C5-1), (C5-2), general formula (C6-I) - (C6-V) general formula (C7-1) - (C7-4) general formula (C8-1) - (C8-6) general formula (C9-1), general formula (C10-1), general formula (C11-1), general formula (C12-1), and general formula (D1-1) - (D1-6), A white luminescence organic electroluminescence element given in said 1, 5, or 6 containing at least at least one sort of compounds chosen from a

compound denoted by general formula (D2-1) - (D2-6) general formula (D3-1) - (D3-6), respectively in a luminous layer.

[0024]8. Said general formula (C2-2), polysilane which has structure unit denoted by (C2-3), The fluorogenic compound whose ratio (N/C) of the number of nitrogen atoms in said molecule to the number of carbon atoms is 0.05 or less [ 0 or more ], The ratio [ as opposed to / as opposed to / in a fluorescence maximum wavelength / 415 nm or less / total of the hydrogen atom and fluorine atom in 500-2000, and a molecule in a molecular weight ] ( $F/(H+F)$ ) of a fluorine atom at least at least one sort of compounds chosen from the fluorogenic compound which are 0-0.9 Or a luminous layer, an electron hole transportation layer, The white luminescence organic electroluminescence element containing in any one layer of the electron transport layer.

[0025]9. Polysilane which has structure unit denoted by said general formula (C2-2) or (C2-3), The fluorogenic compound whose ratio (N/C) of the number of nitrogen atoms in said molecule to the number of carbon atoms is 0.05 or less [ 0 or more ], The ratio [ as opposed to / as opposed to / in a fluorescence maximum wavelength / 415 nm or less / total of the hydrogen atom and fluorine atom in 500-2000, and a molecule in a molecular weight ] ( $F/(H+F)$ ) of a fluorine atom at least one sort of compounds chosen from the fluorogenic compound which are 0-0.9 Or a luminous layer, A white luminescence organic electroluminescence element given in said 8 containing in any one layer of the electron transport layer.

[0026]10. Polysilane which has structure unit denoted by said general formula (C2-2) or (C2-3), The fluorogenic compound whose ratio (N/C) of the number of nitrogen atoms in said molecule to the number of carbon atoms is 0.05 or less [ 0 or more ], [ or at least one sort of compounds chosen from the fluorogenic compound whose ratios / as opposed to / as opposed to / in a fluorescence maximum wavelength / 415 nm or less / total of the hydrogen atom and fluorine atom in 500-2000, and a molecule in a molecular weight / ( $F/(H+F)$ ) of a fluorine atom are 0-0.9 ] A white luminescence organic electroluminescence element given in said 8 containing in a luminous layer.

[0027]11. The white luminescence organic electroluminescence element according to claim 1 containing at least one sort chosen from the compound denoted by the above, a general

formula (E1-1), the general formula (E1-5), the general formula (E2-1), and a general formula (E2-5), respectively in an electron hole transportation layer.

[0028]12. Above, general formula (D1-1) - (D1-6) general formula (D2-1) - (D2-6), The white luminescence organic electroluminescence element containing at least one sort chosen from the compound denoted by general formula (D3-1) - (D3-6) and general formula (F1-1) - (F1-5), respectively in an electron hole prevention layer.

[0029]13. The white luminescence organic electroluminescence element containing in a luminous layer by using as a phosphorescence dopant at least one sort chosen from the compound denoted by said general formula general formula (G1-1) - (G1-5), respectively.

[0030]14. A white luminescence organic electroluminescence element given in said 1-13, wherein white luminescence contains the optic element which originates in phosphorescence emission at least.

[0031]15. A lighting installation which possesses the white luminescence organic electroluminescence element of a description in said any 1 paragraph of 1-14, and is characterized by things.

[0032]16. A display device which possesses the white luminescence organic electroluminescence element of a description in said any 1 paragraph of 1-14, and is characterized by things.

[0033]17. A display device which possesses the white luminescence organic electroluminescence element and displaying means of a description in said any 1 paragraph of 1-14, and is characterized by things.

[0034]18. A display device given in said 17, wherein a displaying means is a liquid crystal display element.

[0035]19. Electrical appliances which possess the white luminescence organic electroluminescence element of a description in said any 1 paragraph of 1-14, and are characterized by things.

[0036]This invention is explained in full detail below.

[0037]First, the fluorogenic compound used in this invention is explained below.

[0038]The compound first denoted by said general formula (A1-1) - (A1-6) is explained.

[0039] $X_1$  and  $X_2$  express an aryl group or a heterocyclic machine among a general formula (A1-1),  $R_1$  and  $R_2$  express an aryl group, a heterocyclic machine, the residue of alicyclic hydrocarbon, or a cycloalkoxy machine, and  $R_2$  either one of  $R_1$  or expresses the residue or cycloalkoxy machine of alicyclic hydrocarbon.  $R_1$  and  $R_2$  may form an alicyclic or heterocyclic ring.  $X_1$  and  $X_2$  may form a ring.

[0040]As an aryl group, there are a phenyl group, a naphthyl group, p-trill machine, p-chlorophenyl machine, a fluorenyl group, etc., for example. As a heterocyclic machine, there are a pyrrolyl machine, a pyrrolidinyl machine, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a triazolyl machine, a benzimidazolyl machine, a benzothiazolyl machine, a benzoxazolyl machine, a frill machine, a thienyl group, a thiazolyl machine, etc. As a residue of alicyclic hydrocarbon, there are residues, such as a cycloalkyl machine and a cycloalkenyl group, and they are cycloalkyl machines (for example, a cyclopentyl group, a cyclohexyl group, etc.) especially preferably as a residue of alicyclic hydrocarbon. As a cycloalkoxy machine, they are for example, a cyclopropyloxy machine, a cyclopenthyloxy machine, a cyclohexyloxy machine, etc. As an alicyclic or heterocyclic ring formed of  $R_1$  and  $R_2$ , the ring of hetero ring types, such as alicyclic rings, such as a cyclo pen ten, cyclo pen TAJIEN, cyclo HEKISEN, and cyclohexa JIEN, and dioxa JIEN, is raised.

[0041] $X_3$  and  $X_4$  express an aryl group or a heterocyclic machine among a general formula (A1-2),  $R_3$  and  $R_4$  express an aryl group, a heterocyclic machine, an aryloxy group, an alkylthio group, or an arylthio group, and  $R_4$  either one of  $R_3$  or expresses an aryloxy group, an alkylthio group, or an arylthio group.  $X_3$  and  $X_4$  may form a ring.

[0042]The same basis as what was raised about  $X_1$  and  $X_2$  in the general formula (A1-1) as an aryl group and a heterocyclic machine is expressed, and the aryl group in an aryloxy group and an arylthio group also expresses said aryl group and the same basis. Bases, such as a methylthio group, are expressed as an alkylthio group.

[0043] $X_5$  and  $X_6$  express an aryl group or a heterocyclic machine among a general formula (A1-3), and  $R_5$  and  $R_6$  express an aryl group, a heterocyclic machine, and a halogen atom, and  $R_6$  either one of  $R_5$  or expresses a halogen atom.  $X_5$  and  $X_6$  may form a ring.

[0044]The same basis as what was raised about  $X_1$  and  $X_2$  in the general formula (A1-1) as the aryl group of  $X_5$  and  $X_6$  and a heterocyclic machine is expressed, and fluoride, chlorine, etc. are expressed as a halogen atom. It is a fluorine atom especially preferably.

[0045]Although  $Ar_{11}$  expresses the Ally Wren machine among a general formula (A1-4),  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ , and  $R_{14}$  express a hydrogen atom or a substituent and  $R_{15}$  and  $R_{16}$  express a hydrogen atom or a substituent, Even if there are little  $R_{15}$  and  $R_{16}$ , either expresses the residue of alicyclic hydrocarbon.  $R_{12}$ ,  $R_{14}$  and  $R_{11}$ ,  $R_{13}$ ,  $R_{12}$  or  $R_{14}$ ,  $R_{16}$ ,  $R_{11}$  or  $R_{13}$ , and  $R_{15}$  may form an alicyclic or heterocyclic ring.

[0046]Although the divalent basis of a phenylene group, a naphthalene group, an anthracene

machine, a biphenylene machine, etc. is expressed as an Ally Wren machine denoted by  $Ar_{11}$ , for example and  $R_{15}$  and  $R_{16}$  express a hydrogen atom or a substituent, There are residues, such as a cycloalkyl machine and a cycloalkenyl group, as a residue of alicyclic hydrocarbon, and they are cycloalkyl machines (for example, a cyclopentyl group, a cyclohexyl group, a cycloheptyl machine, an adamantyl machine, etc.) especially preferably as a residue of alicyclic hydrocarbon. The case where both  $R_{15}$  and  $R_{16}$  are the residues of alicyclic hydrocarbon is especially preferred.  $R_{12}$ ,  $R_{14}$  and  $R_{11}$ ,  $R_{13}$ ,  $R_{12}$ , or  $R_{14}$  and  $R_{16}$ , The ring of alicyclic or heterocycle of 4 members - 7 members, for example, a cyclo BUTEN ring, a cyclopentene ring, a cyclohexene ring, a fluorene ring, etc. may be formed by  $R_{11}$  or  $R_{13}$ , and  $R_{15}$ .

[0047] Although  $Ar_{21}$  expresses the Ally Wren machine among a general formula (A1-5),  $R_{21}$ ,  $R_{22}$ ,  $R_{23}$ , and  $R_{24}$  express a hydrogen atom or a substituent and  $R_{25}$  and  $R_{26}$  express a hydrogen atom or a substituent, Even if there are little  $R_{25}$  and  $R_{26}$ , either expresses an aryloxy group, an alkylthio group, or an arylthio group.  $R_{22}$ ,  $R_{24}$  and  $R_{21}$ ,  $R_{23}$ ,  $R_{22}$  or  $R_{24}$ ,  $R_{26}$ ,  $R_{21}$  or  $R_{23}$ , and  $R_{25}$  may form a ring.

[0048]  $Ar_{21}$  expresses the basis denoted by said  $Ar_{11}$ , and the same basis. About the aryl group of the aryloxy group in  $R_{25}$  and  $R_{26}$ , and an arylthio group, the same basis as what was raised about  $X_1$  and  $X_2$  in the general formula (1) is expressed, and bases, such as MECHIRUCHIO, ECHIRUCHIO, and an isopropyl thio group, are expressed about an alkylthio group. However, even if there are little  $R_{25}$  and  $R_{26}$ , either is an aryloxy group, an alkylthio group, or an arylthio group, and both  $R_{25}$  and  $R_{26}$  are an aryloxy group, an alkylthio group, or an arylthio group preferably.  $R_{22}$ ,  $R_{24}$  or  $R_{21}$ , and  $R_{23}$  may form a fluorene ring etc. cooperatively especially among  $R_{22}$ ,  $R_{24}$  and  $R_{21}$ ,  $R_{23}$ ,  $R_{22}$  or  $R_{24}$ ,  $R_{26}$ ,  $R_{21}$  or  $R_{23}$ , and  $R_{25}$ .

[0049] Although  $Ar_{31}$  expresses the Ally Wren machine among a general formula (A1-6),  $R_{31}$ ,  $R_{32}$ ,  $R_{33}$ , and  $R_{34}$  express a hydrogen atom or a substituent and  $R_{35}$  and  $R_{36}$  express a

hydrogen atom or a substituent, Either is a halogen atom even if there are little  $R_{35}$  and  $R_{36}$ .  
 $R_{32}$ ,  $R_{34}$  and  $R_{31}$ ,  $R_{33}$ ,  $R_{32}$  or  $R_{34}$ ,  $R_{36}$ ,  $R_{31}$  or  $R_{33}$ , and  $R_{35}$  may form a ring.

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For subsequent translation(s), please click on the above "CONTINUE" button.

When continued, the current translation will be overwritten with the new translation.

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[Translation done.]

Continued translation.

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[0050] Although  $Ar_{31}$  expresses the basis denoted by said  $Ar_{11}$ , and the same basis and  $R_{35}$  and  $R_{36}$  express a hydrogen atom or a substituent,  $R_{36}$  either one of  $R_{35}$  or is a halogen atom, and both are halogen atoms preferably. Fluoride, chlorine, etc. are expressed as a halogen atom. It is a fluorine atom especially preferably.  $R_{32}$ ,  $R_{34}$  or  $R_{31}$ , and  $R_{33}$  may form a fluorene ring etc. cooperatively especially.

[0051] In a general formula (A1-4), (A1-5), and (A1-6),  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$ ,  $R_{15}$ ,  $R_{16}$ ,  $R_{21}$ ,  $R_{22}$ ,  $R_{23}$ ,  $R_{24}$ ,  $R_{25}$ ,  $R_{26}$ , When  $R_{31}$ ,  $R_{32}$ ,  $R_{33}$ ,  $R_{34}$ ,  $R_{35}$ , and  $R_{36}$  express a substituent, [ as an example of those substituents ] an alkyl group (for example, a methyl group, an ethyl group, an isopropyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, a perfluoro propyl group, A perfluoro n-butyl group, a perfluoro t-butyl group, t-butyl group, residues of alicyclic hydrocarbon, such as a benzyl group, for example, a cycloalkyl machine, (a cyclopentyl group.) cycloalkenyl groups (for example, a cyclohexenyl group.), such as a cyclohexyl group a cyclo pentenyl machine etc. -- further -- an aralkyl group (for example, a benzyl group.) Aryl groups (for example, a phenyl group, a naphthyl group, p-trill machine, p-chlorophenyl machine, a fluorenyl group, etc.), such as 2-FENECHIRU machine, alkoxy groups (for example, an ethoxy basis, an isopropoxy group, a butoxy machine, etc.), an aryloxy group (for example, phenoxy group etc.), An alkylthio group (MECHIRUCHIO, ECHIRUCHIO, isopropyl thio group, etc.), an arylthio group (for example, a phenylthio group, the Naff Chill thio group, and p-trill thio group.) p-chloro phenylthio group, a hydroxyl machine, and an amino group (a dimethylamino group.) A diaryl amino group, alkenyl groups (for example, an allyl group, 1-ethenyl machine, 1-propenyl machine, 1-butenyl group, 1-octadecenyl machine, etc.), halogen atoms (a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc.), etc. are mentioned. These bases may be replaced further and, [ as said substituent ] A halogen atom, a hydroxyl machine, a nitro group, a cyano group, a carboxyl group, A sulfonic group, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, An alkylthio group, an arylthio group, an ARUKIRU sulfonyl group, an ARIRU sulfonyl group, An alkoxycarbonyl group, an aryloxy carbonyl group, an acyl group, a reed RUOKISHI machine,



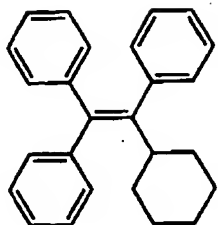
an amino group, a KARUBON amide machine, a sulfonamide group, a carbamoyl group, a sulfamoyl group, a UREIDO machine, an alkoxycarbonylamino machine, a sulfamoylamino group, etc. are mentioned.

[0052]Although the example of a concrete compound denoted by these general formulas below is shown, this invention is not limited to these.

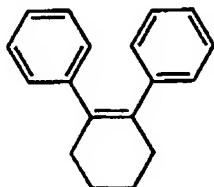
[0053]

[Chemical formula 133]

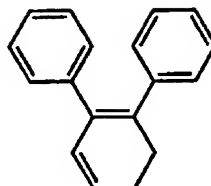
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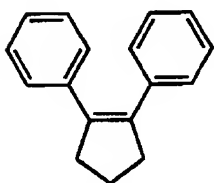
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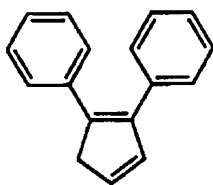
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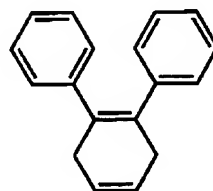
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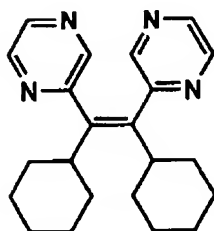
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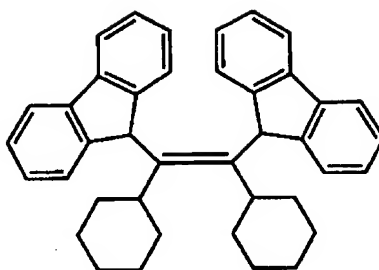
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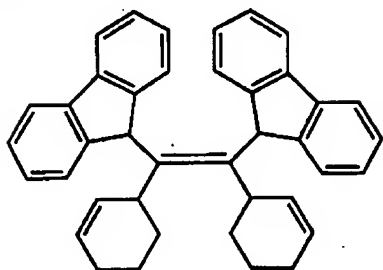
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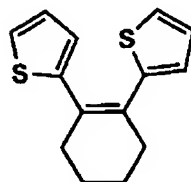
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A1-1-9



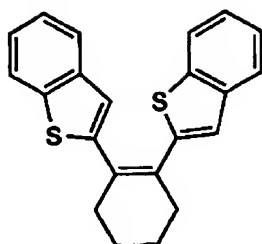
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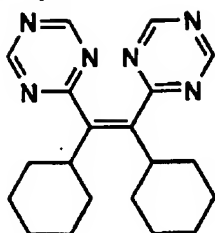
[0054]

[Chemical formula 134]

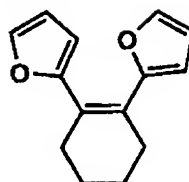
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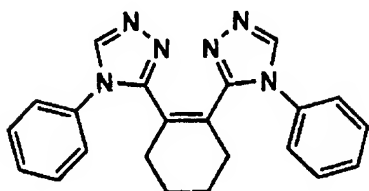
A1-1-12



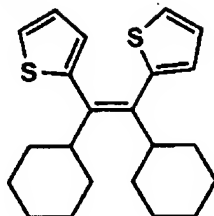
A1-1-13



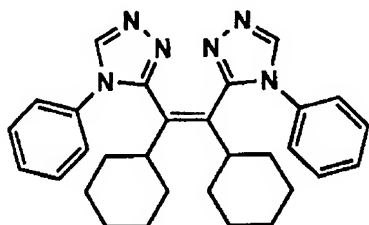
A1-1-14



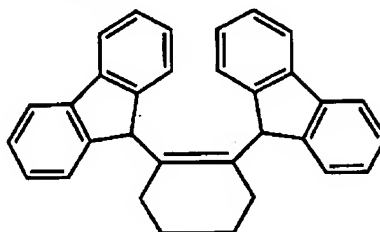
A1-1-15



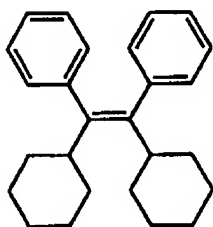
A1-1-16



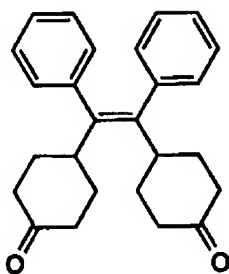
A1-1-17



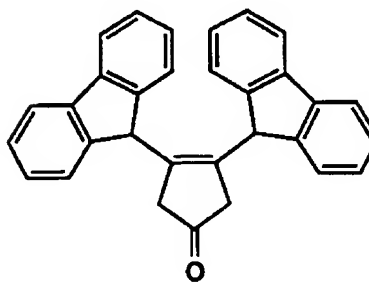
A1-1-18



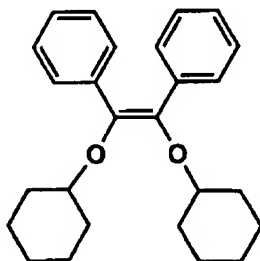
A1-1-19



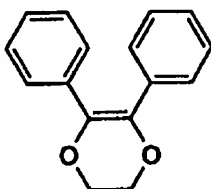
A1-1-20



A1-1-21



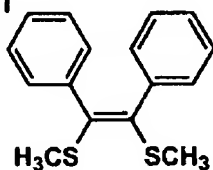
A1-1-22



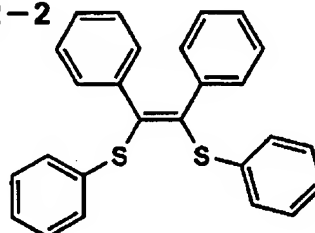
[0055]

[Chemical formula 135]

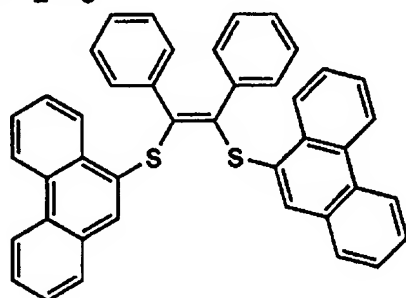
A1-2-1



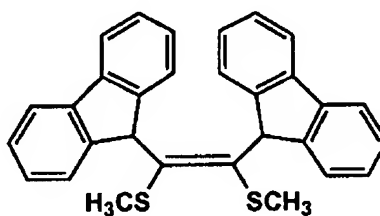
A1-2-2



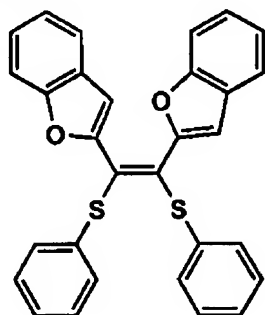
A1-2-3



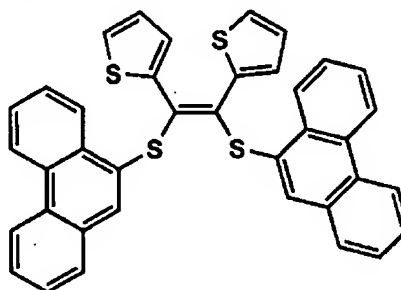
A1-2-4



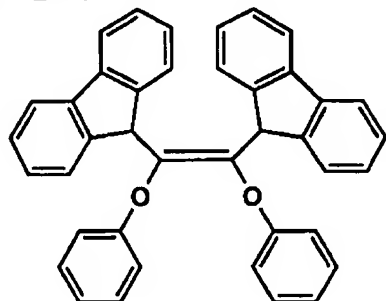
A1-2-5



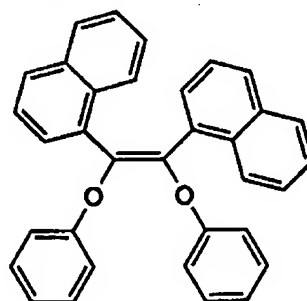
A1-2-6



A1-2-7



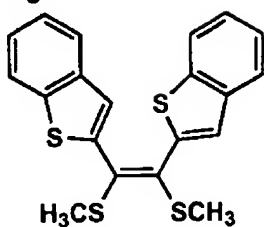
A1-2-8



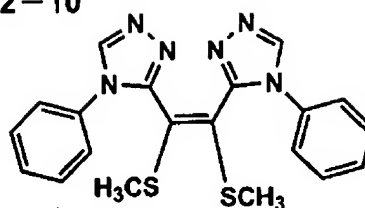
[0056]

[Chemical formula 136]

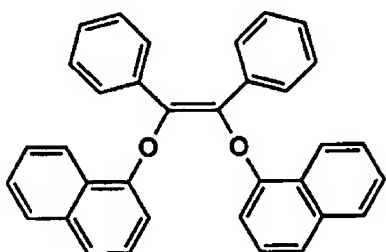
A1-2-9



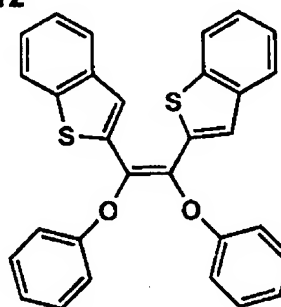
A1-2-10



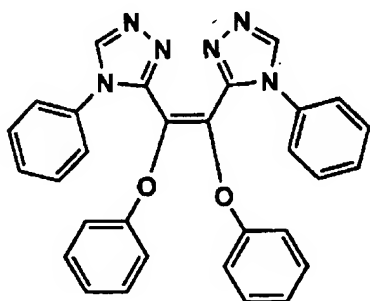
A1-2-11



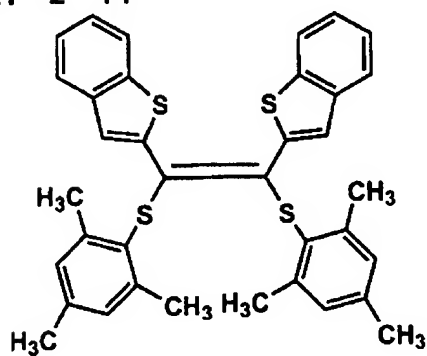
A1-2-12



A1-2-13



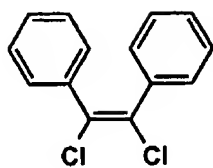
A1-2-14



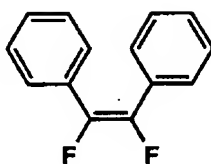
[0057]

[Chemical formula 137]

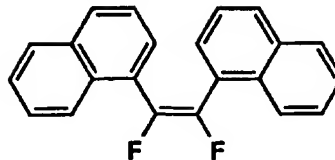
A1-3-1



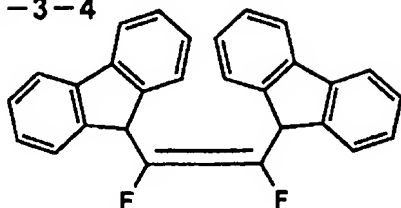
A1-3-2



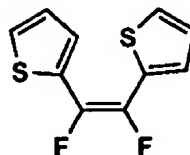
A1-3-3



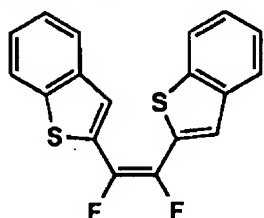
A1-3-4



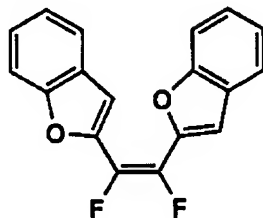
A1-3-5



A1-3-6



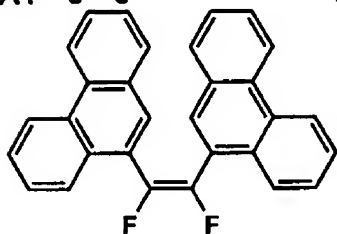
A1-3-7



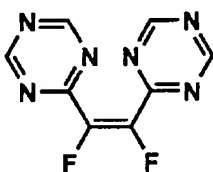
A1-3-8



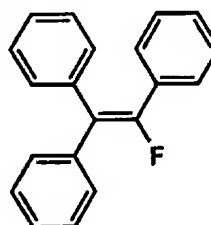
A1-3-9



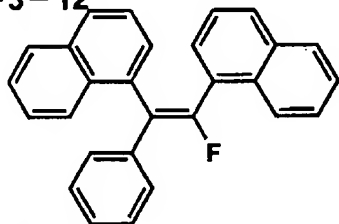
A1-3-10



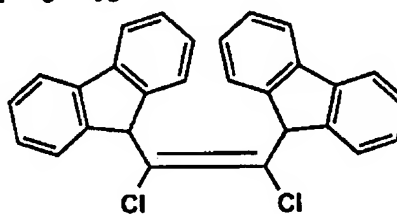
A1-3-11



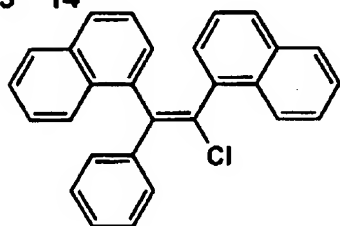
A1-3-12



A1-3-13



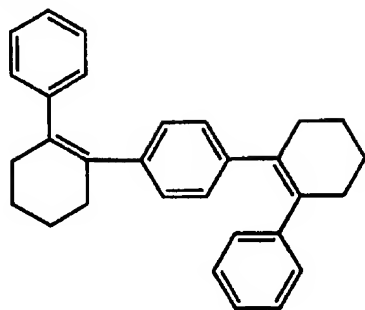
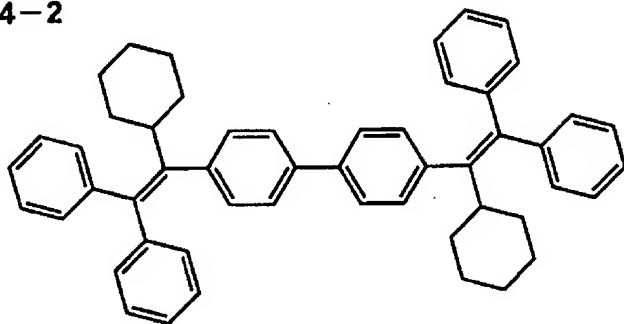
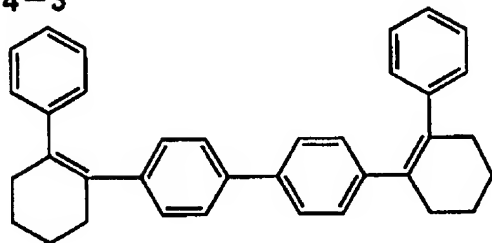
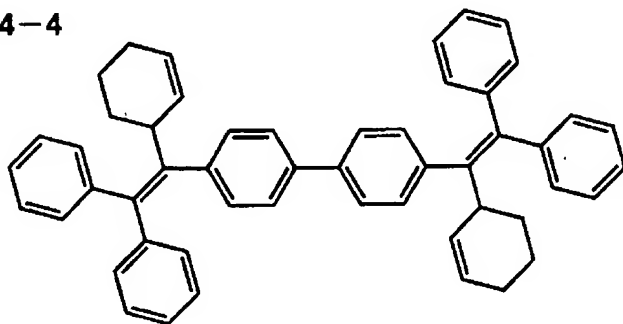
A1-3-14





[0058]

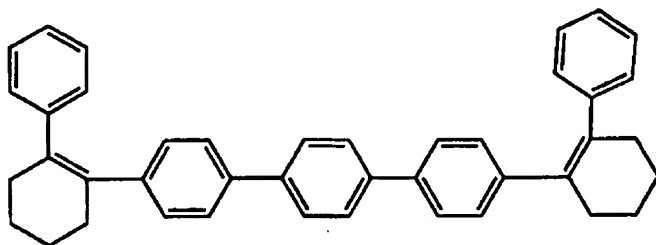
[Chemical formula 138]

**A1-4-1****A1-4-2****A1-4-3****A1-4-4**

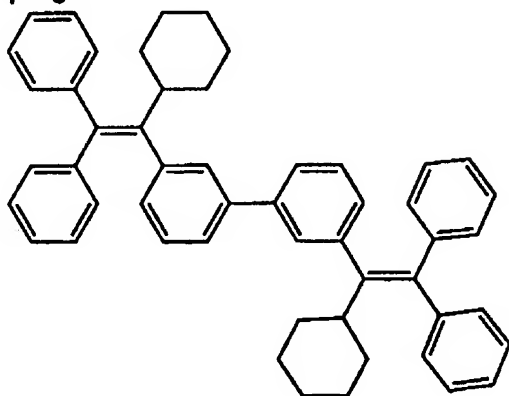
[0059]

[Chemical formula 139]

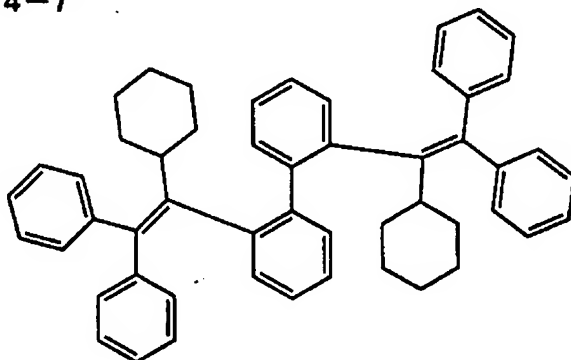
A1-4-5



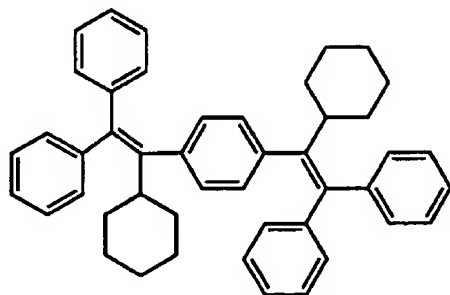
A1-4-6



A1-4-7



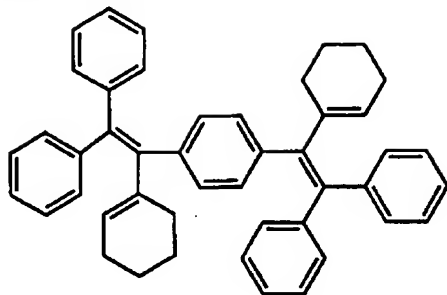
A1-4-8



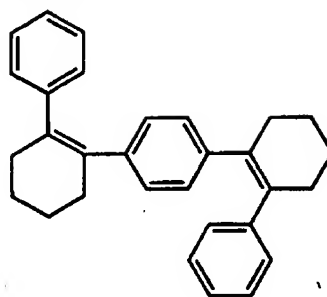
[0060]

[Chemical formula 140]

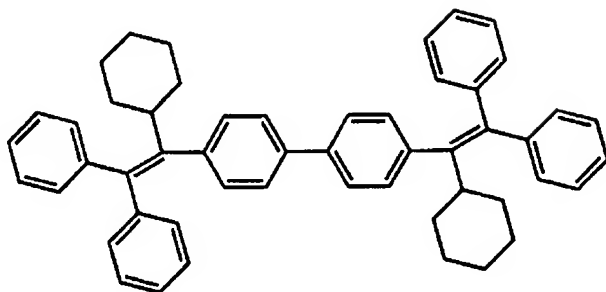
A1-4-9



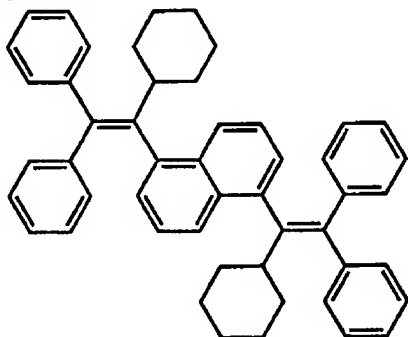
A1-4-10



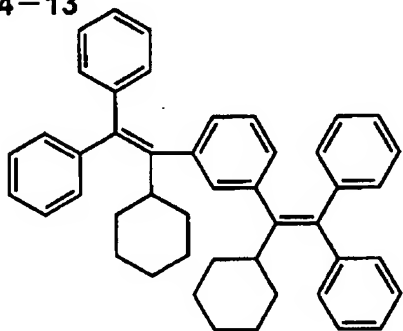
A1-4-11



A1-4-12



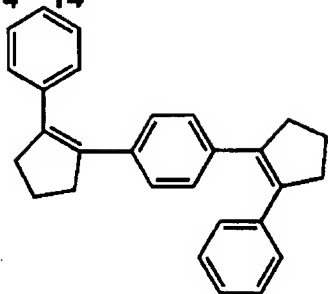
A1-4-13



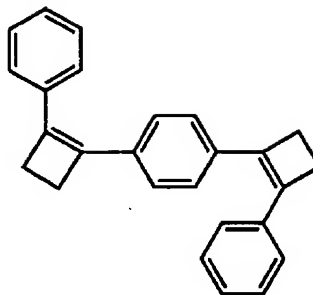
[0061]

[Chemical formula 141]

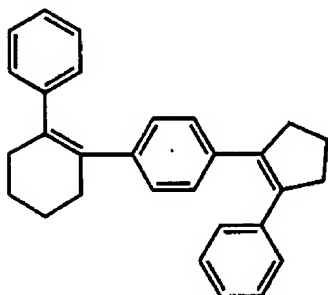
A1-4-14



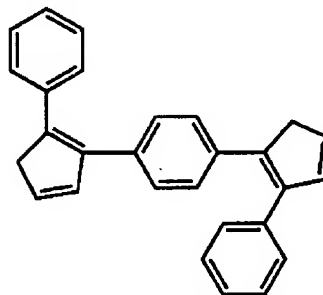
A1-4-15



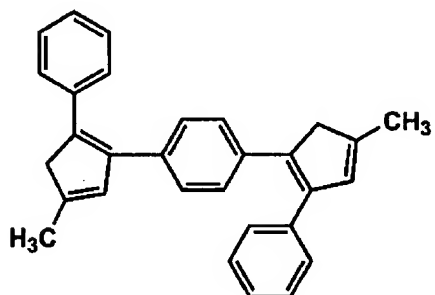
A1-4-16



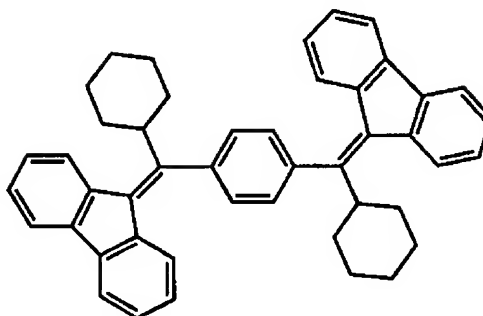
A1-4-17



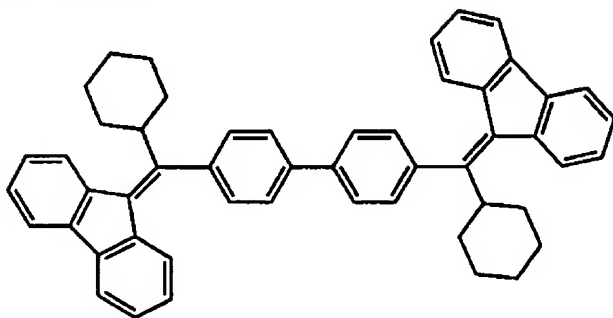
A1-4-18



A1-4-19



A1-4-20

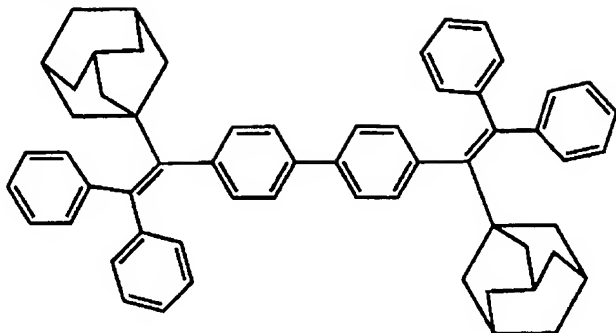


[0062]

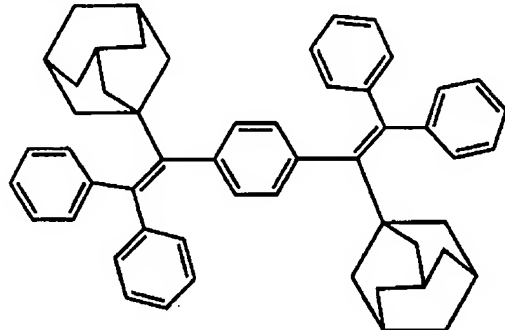
[Chemical formula 142]



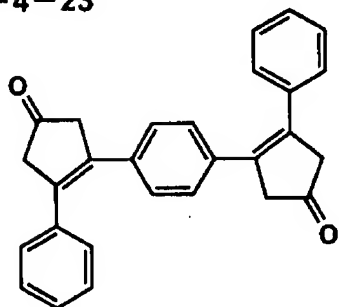
A1-4-21



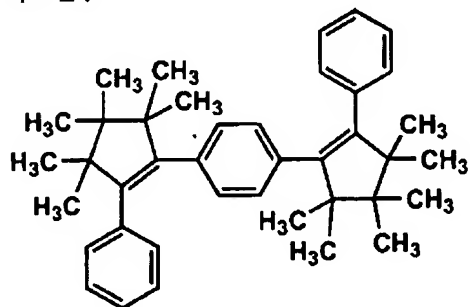
A1-4-22



A1-4-23



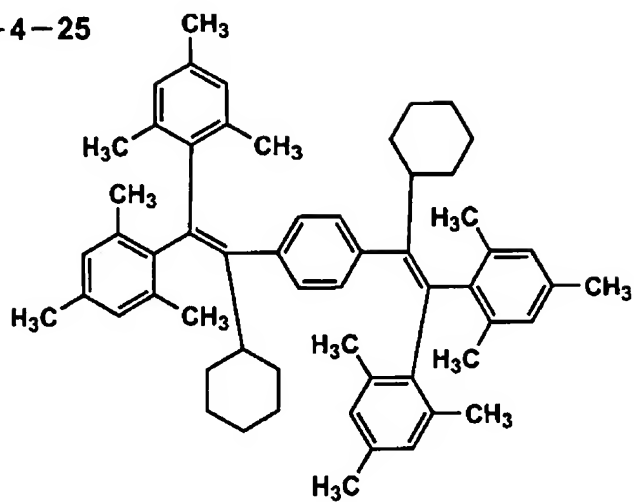
A1-4-24



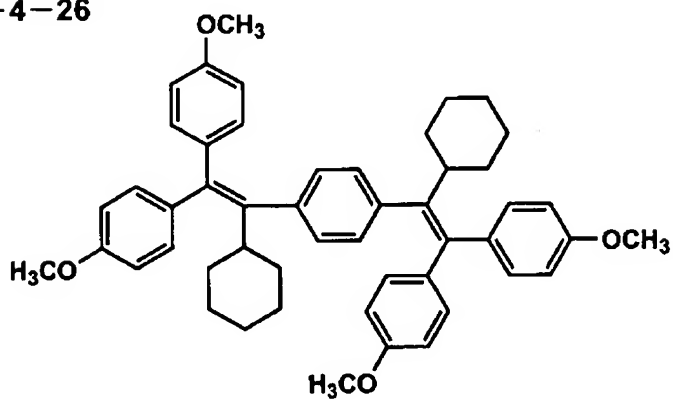
[0063]

[Chemical formula 143]

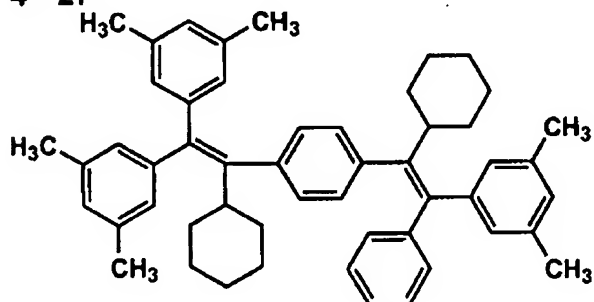
A1-4-25



A1-4-26



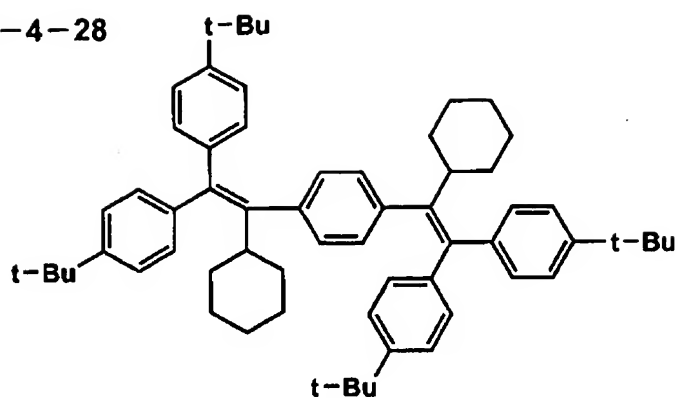
A1-4-27



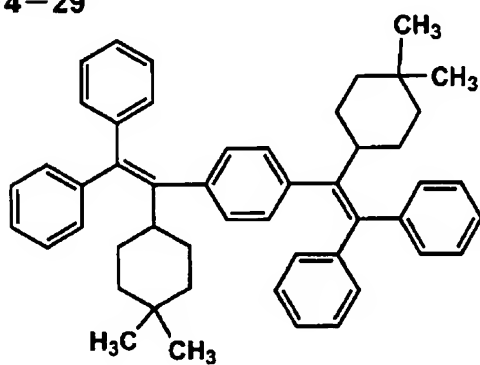
[0064]

[Chemical formula 144]

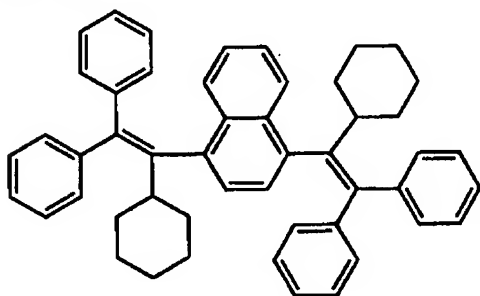
**A1-4-28**



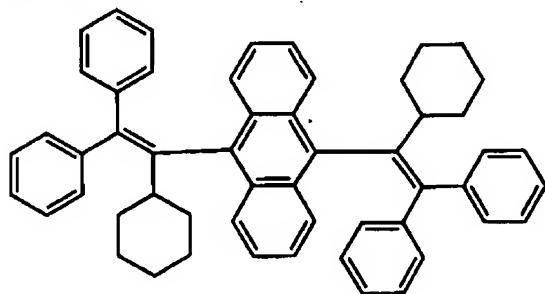
**A1-4-29**



**A1-4-30**



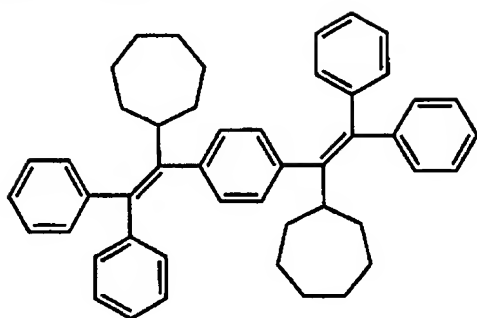
**A1-4-31**



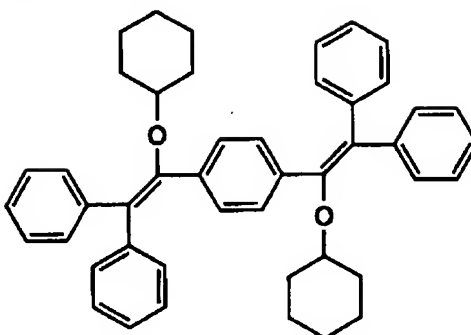
[0065]

[Chemical formula 145]

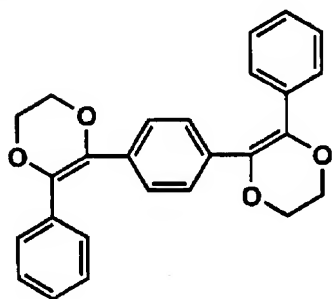
A1-4-32



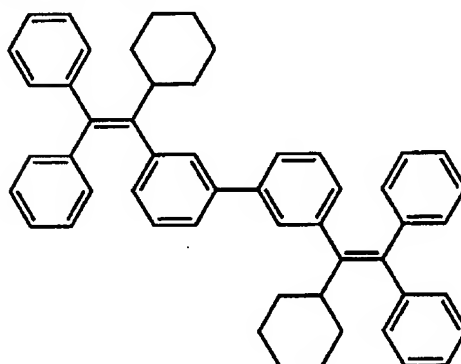
A1-4-33



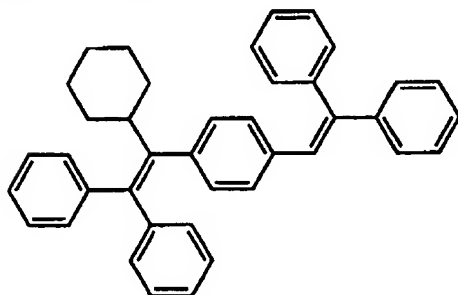
A1-4-34



A1-4-35



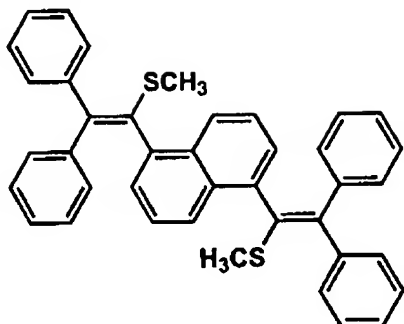
A1-4-36



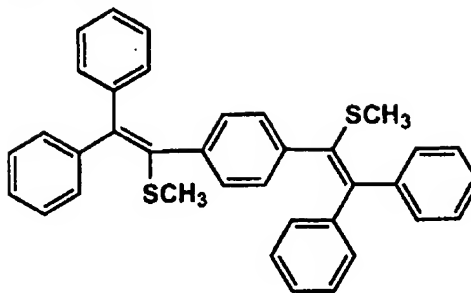
[0066]

[Chemical formula 146]

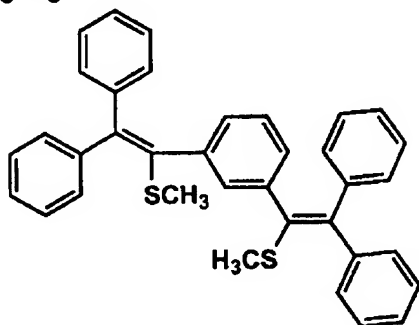
A1-5-1



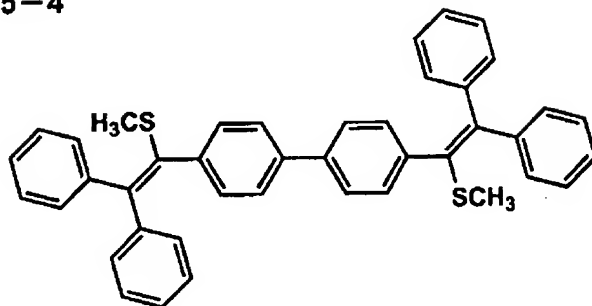
A1-5-2



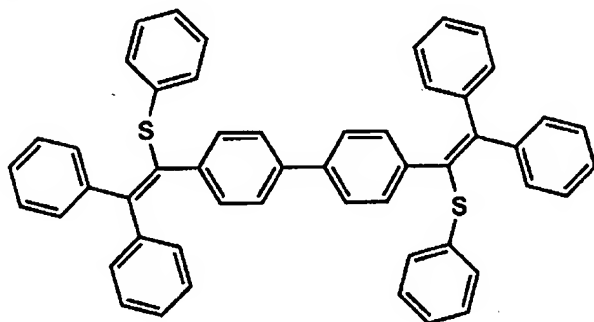
A1-5-3



A1-5-4



A1-5-5

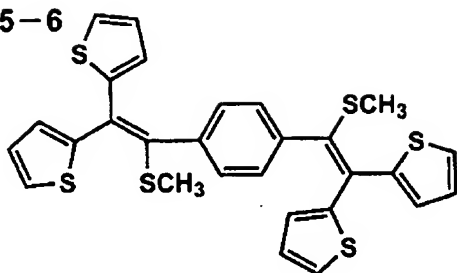


[0067]

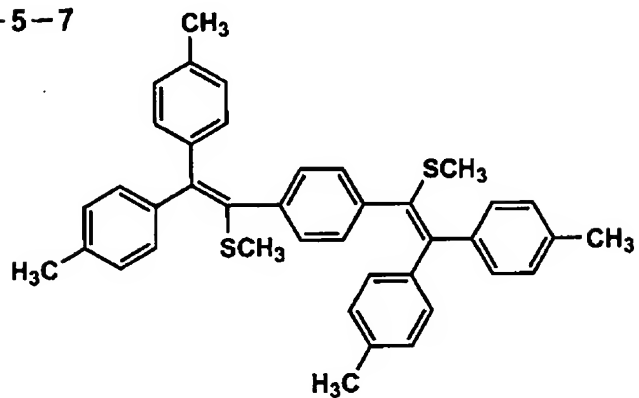
[Chemical formula 147]



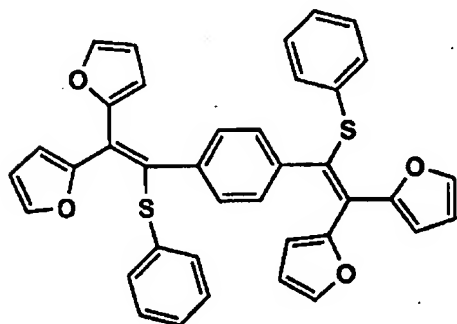
A1-5-6



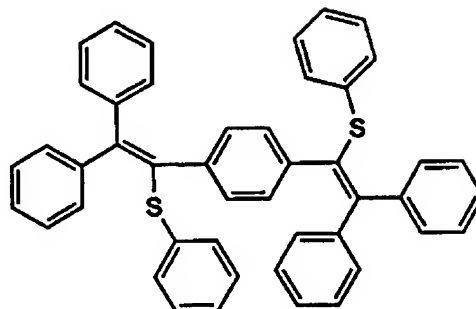
A1-5-7



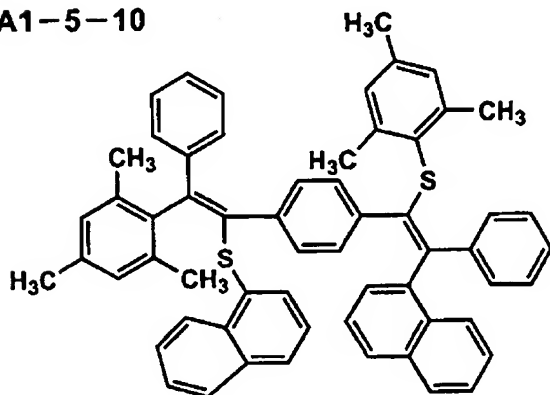
A1-5-8



A1-5-9



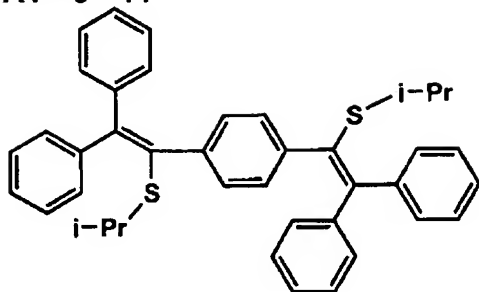
A1-5-10



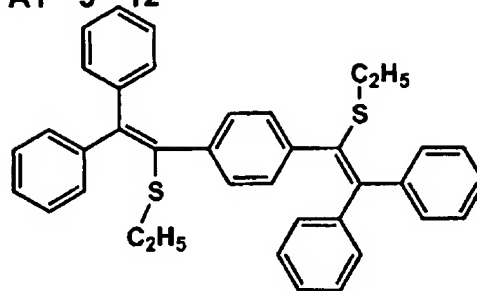
[0068]

[Chemical formula 148]

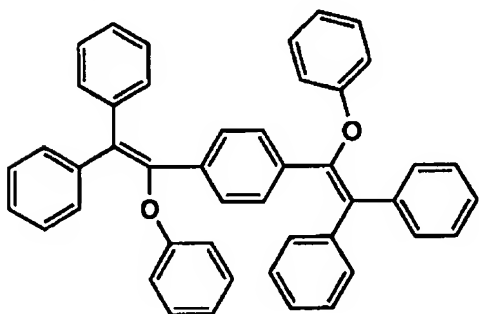
A1-5-11



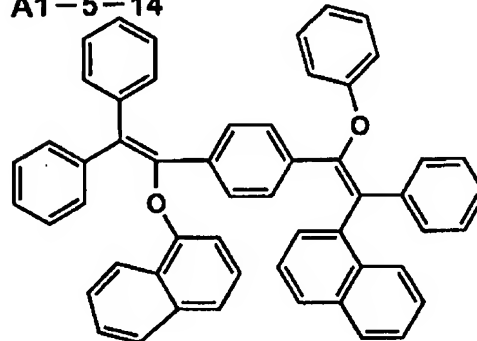
A1-5-12



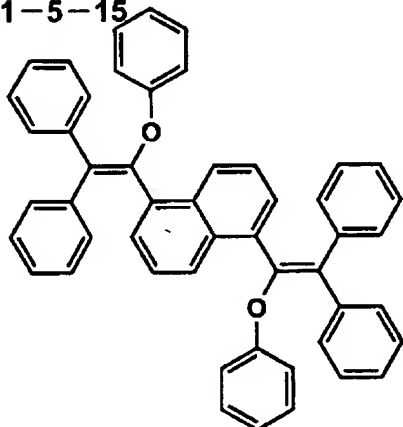
A1-5-13



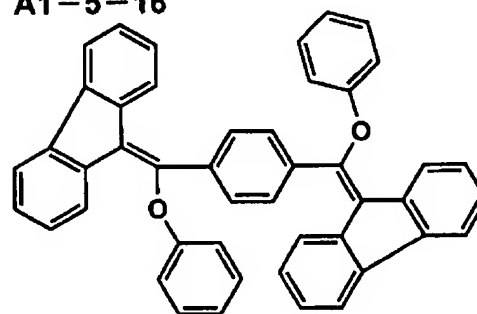
A1-5-14



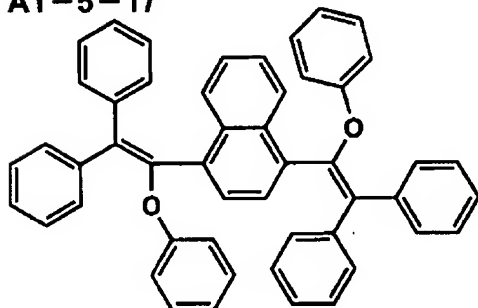
A1-5-15



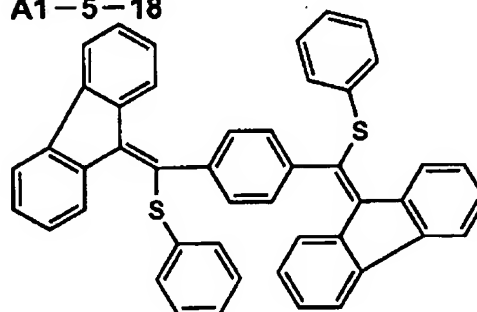
A1-5-16



A1-5-17



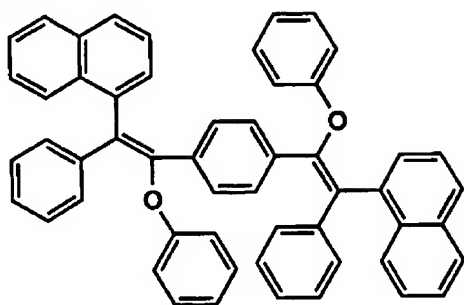
A1-5-18



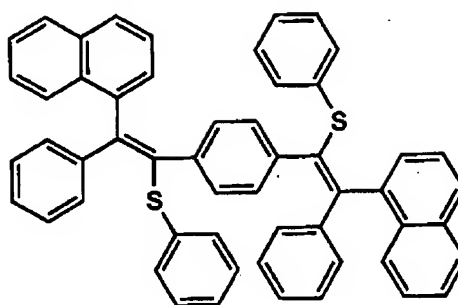
[0069]

[Chemical formula 149]

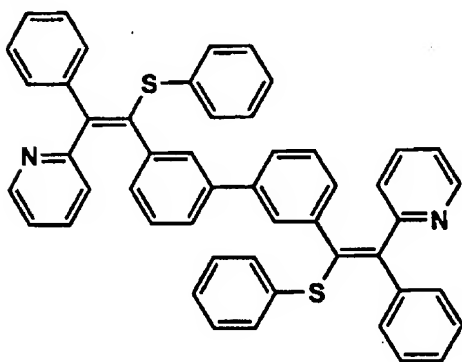
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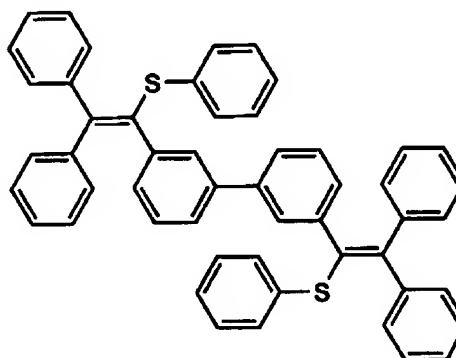
A1-5-20



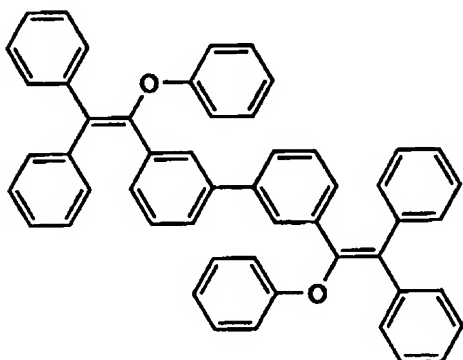
A1-5-21



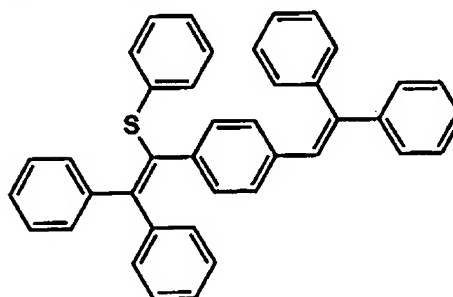
A1-5-22



A1-5-23



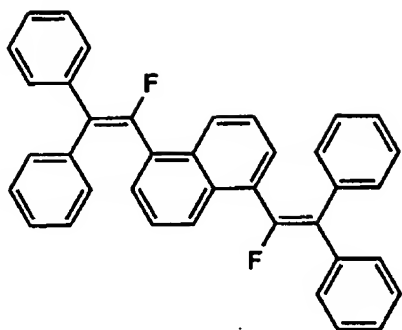
A1-5-24



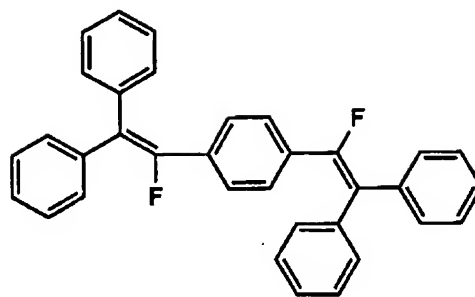
[0070]

[Chemical formula 150]

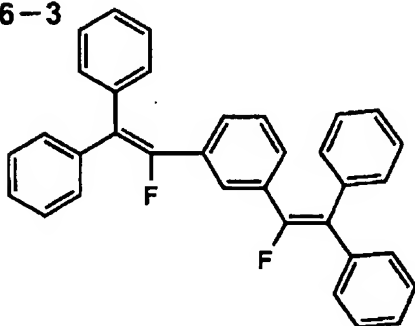
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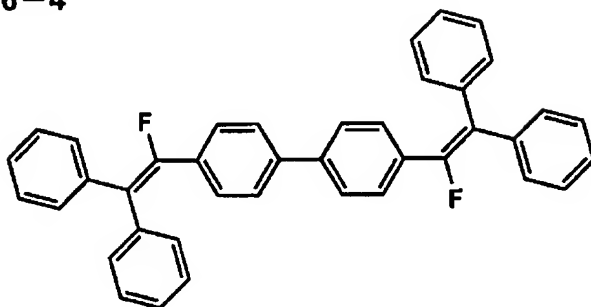
A1-6-2



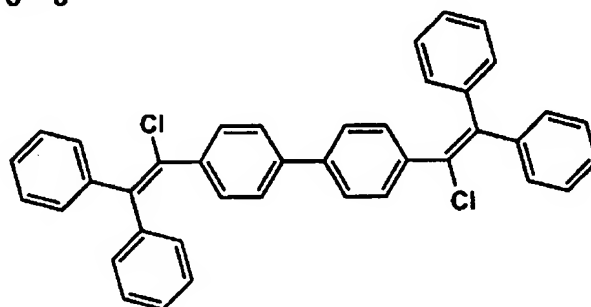
A1-6-3



A1-6-4



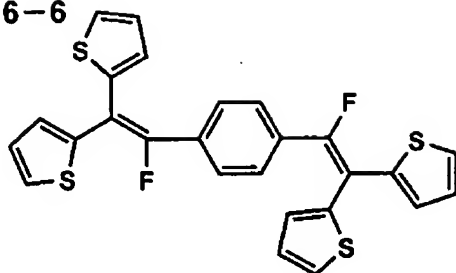
A1-6-5



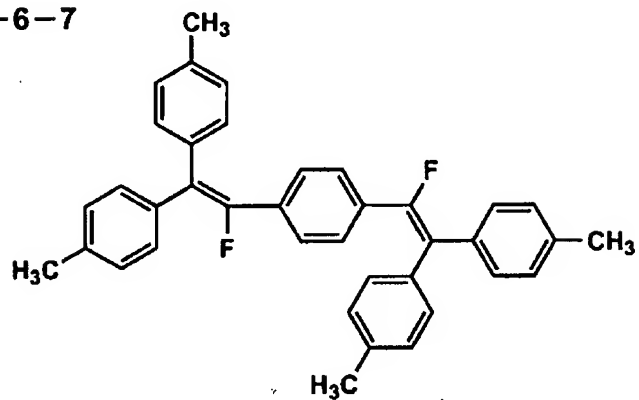
[0071]

[Chemical formula 151]

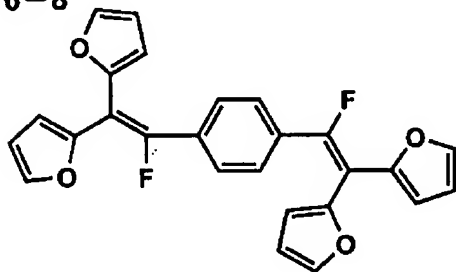
A1-6-6



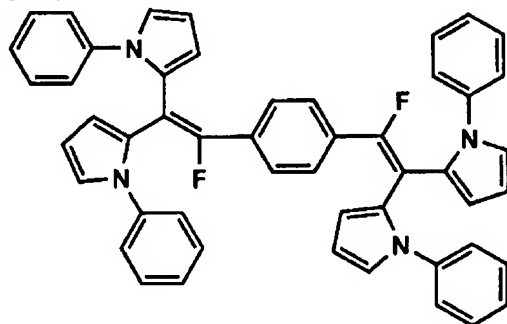
A1-6-7



A1-6-8



A1-6-9



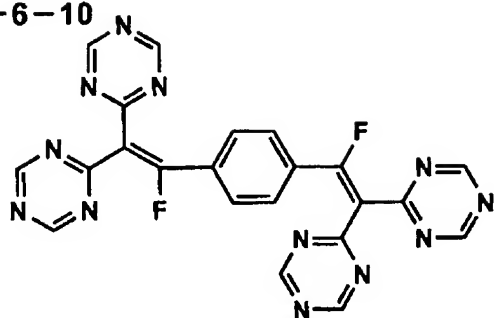


[0072]

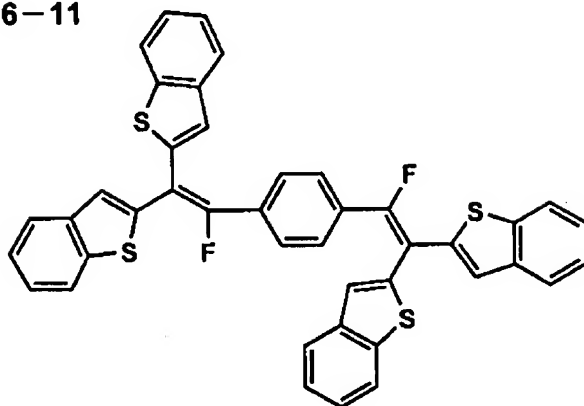
[Chemical formula 152]

/

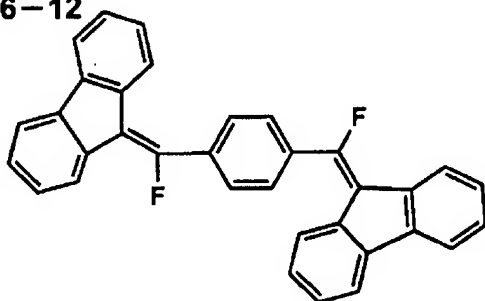
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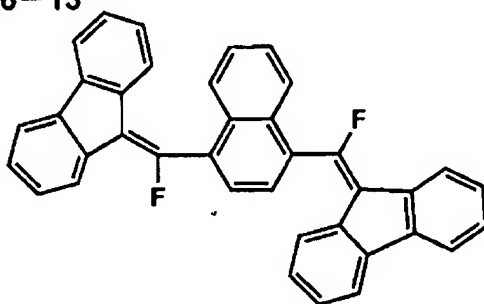
A1-6-11



A1-6-12



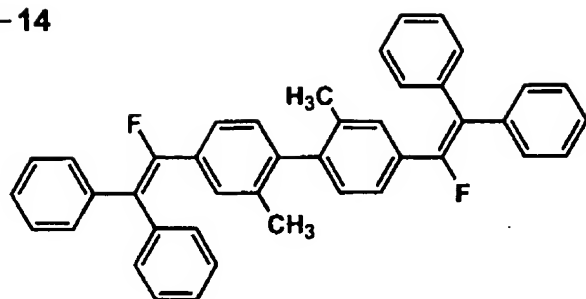
A1-6-13



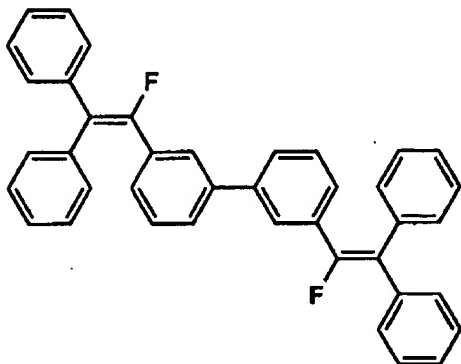
[0073]

[Chemical formula 153]

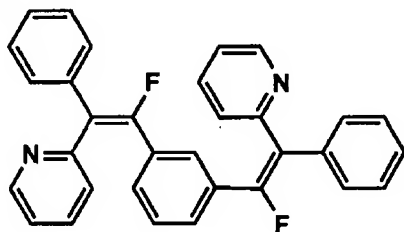
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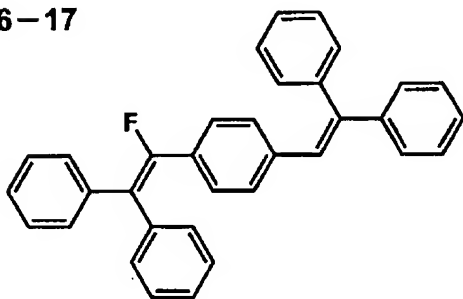
A1-6-15



A1-6-16



A1-6-17

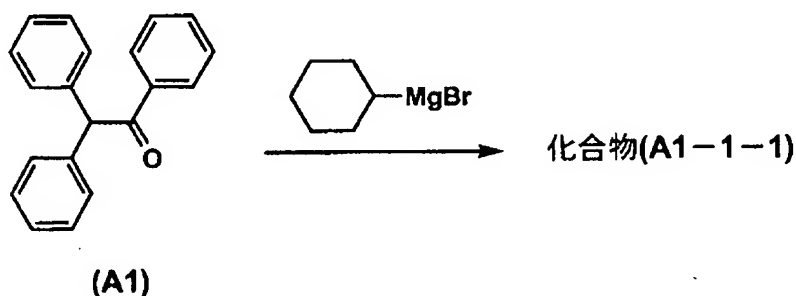


[0074]Below, the concrete synthetic example of the compound of these this inventions is shown.

[0075]A synthetic example <composition of a compound (A1-1-1)>

[0076]

[Chemical formula 154]



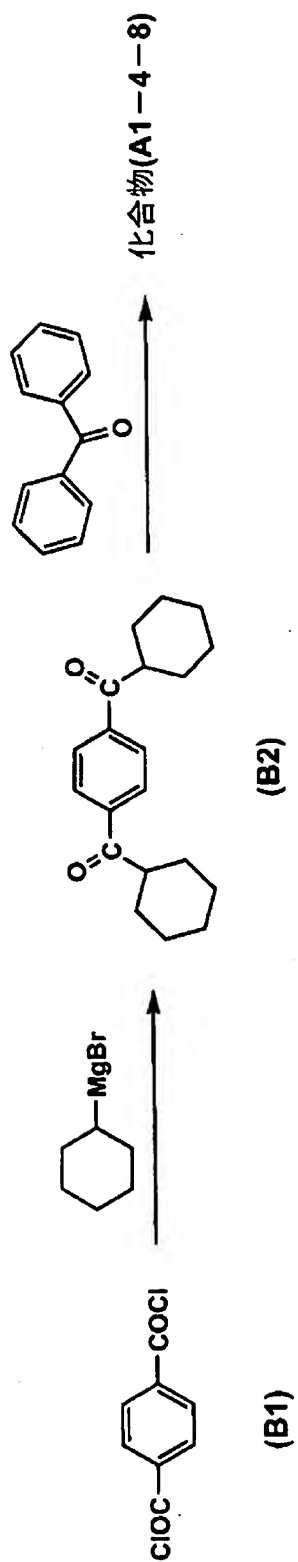
[0077]10 g of compounds (A1) were dissolved in 50 ml of drying tetrahydro frans under a nitrogen atmosphere after deaerating a reaction vessel. then -- receiving a compound (A1) with a tetrahydrofuran solution in cyclohexyl magnesium bromide, keeping reaction liquid at -5 \*\* -0 \*\* -- etc. -- only the part which serves as Mol was dropped. Reaction liquid was agitated at room temperature after 1-hour churning at 0 \*\* for 30 minutes. Then, reaction liquid was opened in water and ethyl acetate extracted. After washing an organic layer in sodium carbonate solution 5%, it washed 3 times, the organic layer was separated, and decompression distilling off of ethyl acetate and the tetrahydro franc was carried out after dryness with magnesium sulfate. After refining by column chromatography, the re-crystal was performed by acetonitrile and 9.3g (75% of \*\*\*\*) of the target compounds (A1-1-1) were obtained.

[0078]With NMR and a mass spectrum, it checked that it was the purpose compound (A1-1-1).

[0079]A synthetic example <composition of a compound (A1-4-8)>

[0080]

[Chemical formula 155]



[0081] 0.05 g and 5 g of compounds (B1) were dissolved for 1 and 3-bis(diphenylphosphino) propane nickel (II) chloride in 50 ml of drying tetrahydrofrancs under a nitrogen atmosphere after deaerating a reaction vessel. Then, only the part which serves as Mol twice to a compound (B1) with a tetrahydrofuran solution trickled cyclohexyl magnesium bromide, keeping reaction liquid at -5 °C-0 °C. Reaction liquid was agitated at room temperature after 1-hour churning at 0 °C for 30 minutes. Then, reaction liquid was extracted (ed) and ethyl acetate extracted. After washing an organic layer in sodium carbonate solution 5%, it was washed 3 times, the organic layer was separated, and decompression distilling off of ethyl acetate and the tetrahydrofranc was carried out after dryness with magnesium sulfate. After refining by column chromatography, the re-crystal was performed by acetonitrile and 4.7g (65% of yield) of compounds (B-2) were obtained.

[0082] After deaeration, under a nitrogen atmosphere, the compound (B-2) was dissolved in 4.0 g, and 12.3 g of benzophenone was dissolved in 50 ml of drying tetrahydrofrancs. After feeding titanium tetrachloride into 3.0-ml reaction liquid, 100 ml of zincy tetrahydrofuran solutions were slowly dropped with suspension. Reflux of the reaction liquid was carried out for 3 hours. Then, reaction liquid was extracted (ed) and ethyl acetate extracted, after dropping 50 ml of chloride solution 3% and agitating for 2 hours. The organic layer was washed 3 times, the organic layer was separated, and decompression distilling off of ethyl acetate and the tetrahydrofranc was carried out after dryness with magnesium sulfate. After refining by column chromatography, methanol performed the re-crystal and 4.1g (51% of yield) of compounds (A1-4-8) were obtained.

[0083] With NMR and a mass spectrum, it checked that it was the purpose compound (A1-4-8).

[0084] A synthetic example <composition of a compound (A1-6-2)>

[0085]



[Chemical formula 156]



[0086]After deaerating a reaction vessel, 10 g of terephthal aldehyde, and 10 g of diethyl phosphite and the triethyl amine 15g were added under a nitrogen atmosphere, and it agitated at room temperature for 10 minutes. The deposit thing was filtered and (C1) was obtained by washing with dichloromethane (80% of \*\*\*\*). [ of 24g ] Subsequently, 5 g of diethylamino sulfur trifluoride (DAST) was added at room temperature after deaeration in the solution which carried out the suspension dissolution of the 3.2 (C1) g under a nitrogen atmosphere at 50 ml of dichloromethane. After dropping became yellow solution. 5% of sodium bicarbonate solution was added for this solution after 20-minute churning, and the reaction was quenched. Reaction liquid was \*\*\*\*\* (ed) and the organic layer of dichloromethane was extracted. After washing the organic layer twice, it dried with magnesium sulfate. (C2) was obtained by distilling off a solvent (78% of \*\*\*\*). [ of 2.3g ] 2.0 (C2) g was dissolved in a 100-ml drying tetrahydro franc under a nitrogen atmosphere, and it cooled at -78 degree with dry ice/acetone. 10 ml of n-hexane solution of n-butyl lithium was slowly dropped at this reaction liquid. After 1-hour churning, room temperature was used and it agitated for further 3 hours, after adding 2.0 g and agitating benzophenone for a while. Then, decompression distilling off of the solvent was carried out, ethyl acetate and water were added, and the organic layer was extracted. Decompression distilling off of the ethyl acetate was carried out after dryness with magnesium sulfate, column chromatography refined, and a 1.6-g object was obtained (70% of \*\*\*\*). With NMR and a mass spectrum, it checked that it was the purpose compound (A1-6-2).

[0087]A synthetic example <composition of a compound (A1-5-2)>

[0088]

[Chemical formula 157]



[0089]The compound (D1) was conventionally compounded by the publicly known method. (D1) 5.0 g was dissolved in a 200-ml drying tetrahydro franc under a nitrogen atmosphere, and it cooled at -78 degree with dry ice/acetone. 25 ml of n-hexane solution of n-butyl lithium was slowly dropped at this reaction liquid. After 1-hour churning, room temperature was used and it agitated for further 3 hours, after 3.0g's having added and agitating methyldi sulfanil methane for a while. Then, decompression distilling off of the solvent was carried out, ethyl acetate and water were added, and the organic layer was extracted. carrying out decompression distilling off of the ethyl acetate after dryness with magnesium sulfate -- column chromatography -- refining (D2) -- 4.6g was obtained (74% of \*\*\*\*). 4.0 g and 4.0 g of benzophenone were dissolved for (D2) in 100 ml of dimethyl sulfoxide, 2.0 g of potassium t-butoxide was added to this, and it was neglected overnight, after carrying out heating churning for bottom 9 hours of a nitrogen air current. The crystal which added 100 ml of methanol to the obtained mixture, and deposited was filtered. 100 ml of methanol washed the filtered crystal 3 times continuously 3 times with 100 ml of water, column refining was performed, and 2.9 g was obtained for the object (65% of \*\*\*\*). With NMR and a mass spectrum, it checked that it was the purpose compound (A1-5-2).

[0090]The compound denoted by said general formula (A2-1) is explained.

[0091]In a general formula (A2-1), P expresses a phosphorus atom and  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$ , and  $R_{15}$  express the substituent of 1 value.

[0092]as the substituent of 1 value -- an alkyl group (a methyl group, an ethyl group, and i-propyl group.) A hydroxyethyl machine, a methoxymethyl machine, a trifluoromethyl group, t-butyl group, aryl groups (a phenyl group.), such as a cyclopentyl group, a cyclohexyl group, and a benzyl group alkenyl groups (a vinyl group.), such as a naphthyl group, p-trill machine, and p-chlorophenyl machine alkynyl groups (ethynyl group etc.) and alkyloxy machines (a methoxy group.), such as a propenyl machine and a styryl machine Aryloxy groups, such as an ethoxy basis, i-propoxy group, and a butoxy machine (phenoxy group etc.), An alkylthio group (a methylthio group, an ethyl thio group, i-propyl thio group, etc.), arylthio groups (phenylthio group etc.), an amino group, and an alkylamino group (a dimethylamino group.) arylamino machines (an ANIRINO machine.), such as a diethylamino machine and an ethyl methylamino machine halogen atoms (a fluorine atom, a chlorine atom, and a bromine atom.), such as a

diphenylamino machine A cyano group, a nitro group, heterocyclic machines, etc. (a pyrrole group, a pyrrolidyl machine, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, a benzoxazolyl machine, etc.), such as an iodine atom, are mentioned. Adjoining substituents may form a ring.

[0093]It is a time of at least three in  $R_{11}$  -  $R_{15}$  being an aromatic series machine preferably, and is a time of all of  $R_{11}$  -  $R_{15}$  being aromatic series machines more preferably. As an aromatic series machine, the above-mentioned aryl group and heteroaryl groups (a pyrrole group, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, benzoxazolyl, etc.) are mentioned.

[0094]Next, a general formula (A2-2) is explained. P expresses a phosphorus atom,  $R_{21}$ ,  $R_{22}$ , and  $R_{23}$  express the substituent of 1 value, and X expresses a chalcogen atom.

[0095]The substituent same as a substituent of 1 value as  $R_{11}$  in a general formula (A2-1) -  $R_{15}$  is mentioned, and it is an oxygen atom or a sulfur atom preferably as a chalcogen atom, and is an oxygen atom most preferably.

[0096]Next, a general formula (A2-3) is explained. P expresses a phosphorus atom among a formula,  $R_{31}$  expresses the substituent of 1 value, and  $X_{31}$ ,  $X_{32}$ ,  $X_{33}$ ,  $X_{34}$ ,  $X_{35}$ ,  $X_{36}$ ,  $X_{37}$ , and  $X_{38}$  express a nitrogen atom or C- $R_{32}$ , respectively. when the plurality of  $X_{31}$ ,  $X_{32}$ ,  $X_{33}$ ,  $X_{34}$ ,  $X_{35}$ ,  $X_{36}$ ,  $X_{37}$ , and  $X_{38}$  is denoted by C- $R_{32}$ , each may be the same or may differ.  $R_{32}$  expresses the substituent of 1 value.

[0097]The substituent same as a substituent of 1 value as  $R_{11}$  in a general formula (A2-1) -  $R_{15}$  is mentioned. It is a time of being expressed with a general formula (A2-4) preferably, and is a time of  $R_{41}$  in a general formula (A2-4) being an aromatic series machine more preferably.

[0098]Although the compound of this invention may be used for which layer of an organic electroluminescence element, it is a compound which has strong fluorescence in a solid state. It excels also in electric field luminescence and can be effectively used as a luminescent material.

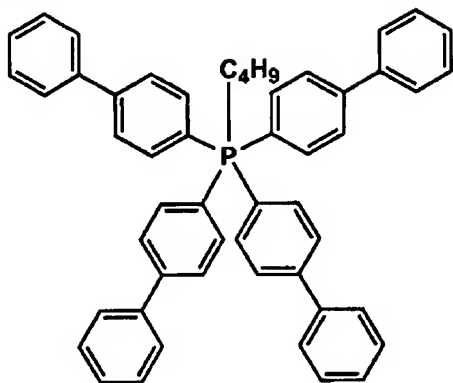
Since it excels in electronic pouring nature and electron transport property outstanding from the metal electrode very much, also when it is used as an electronic transportation material, the outstanding luminous efficiency is shown in the element using other luminescent materials.

[0099]Although the example of a concrete compound is given to below, this invention is not limited to these.

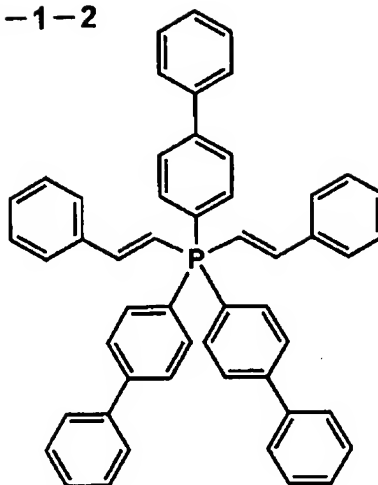
[0100]

[Chemical formula 158]

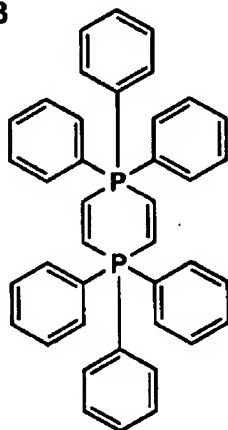
A2-1-1



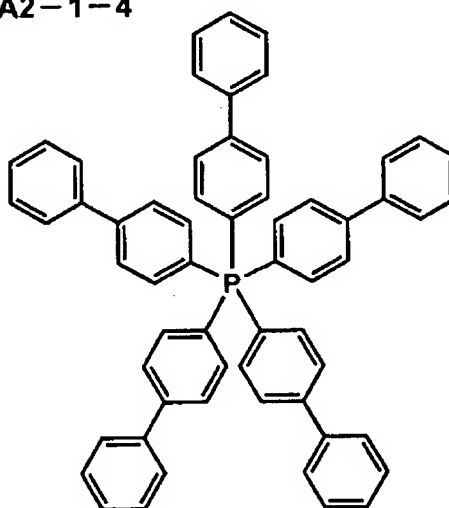
A2-1-2



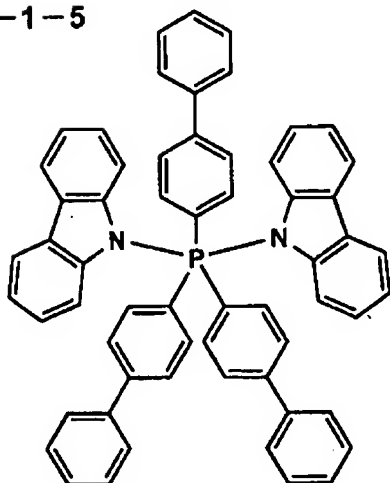
A2-1-3



A2-1-4



A2-1-5

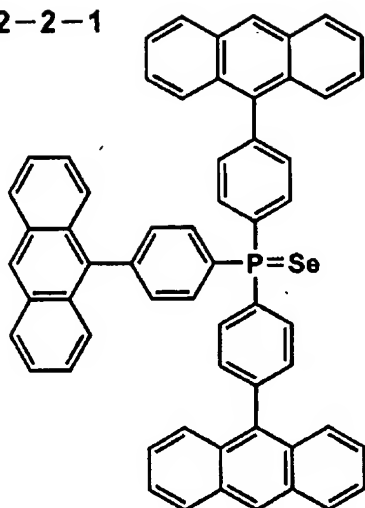




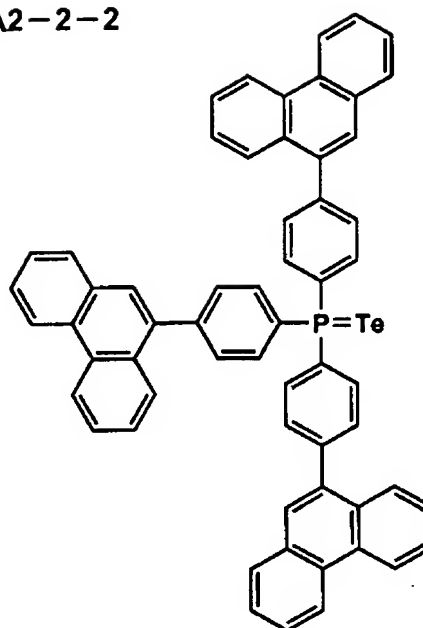
[0101]

[Chemical formula 159]

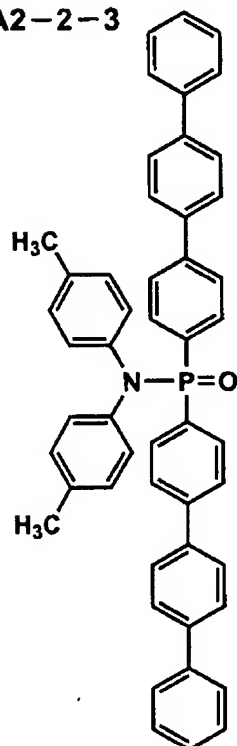
A2-2-1



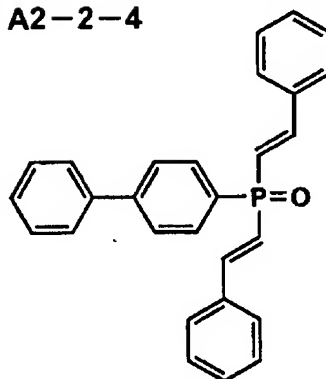
A2-2-2



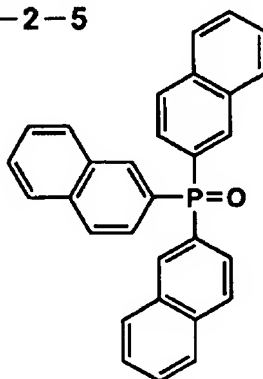
A2-2-3



A2-2-4

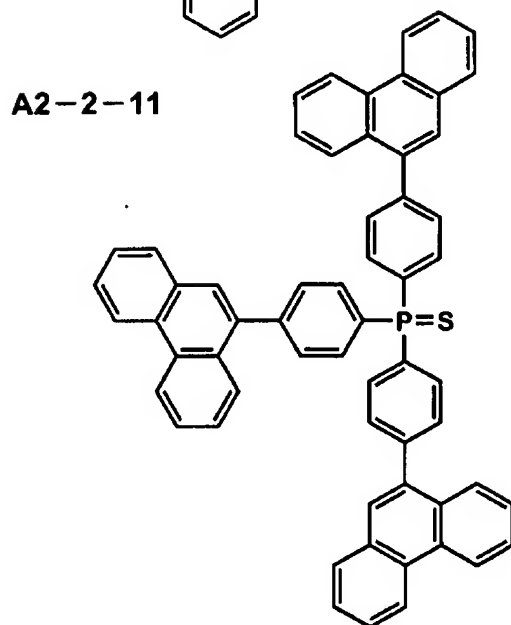
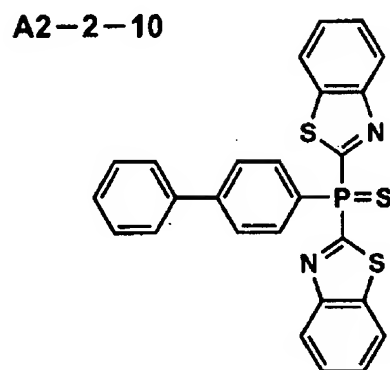
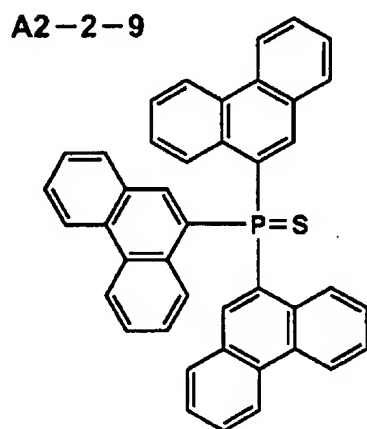
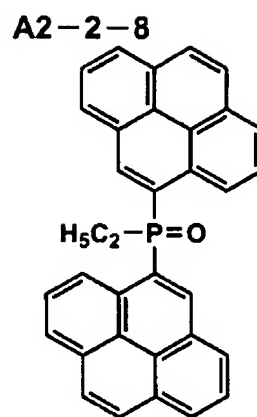
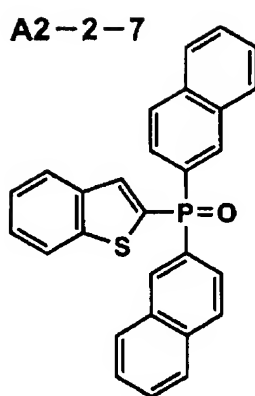
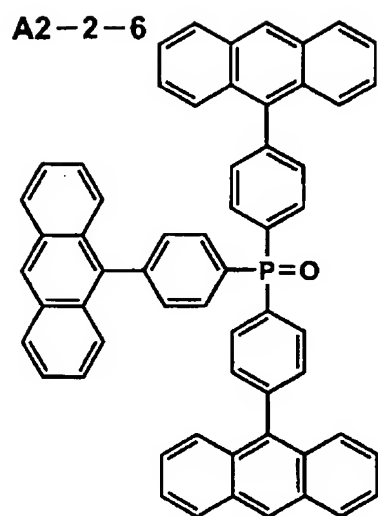


A2-2-5



[0102]

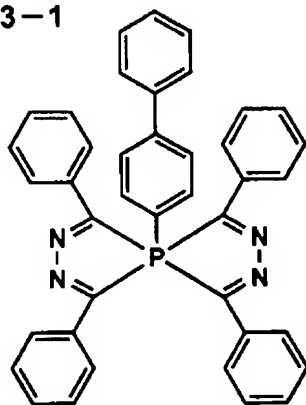
[Chemical formula 160]



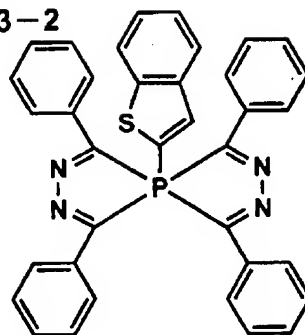
[0103]

[Chemical formula 161]

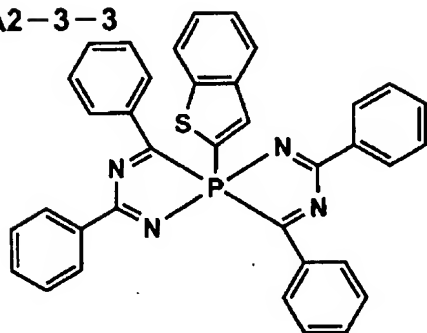
A2-3-1



A2-3-2



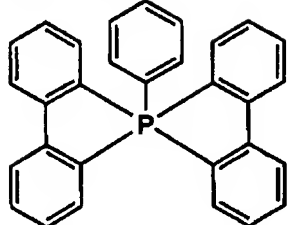
A2-3-3



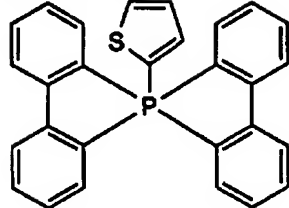
[0104]

[Chemical formula 162]

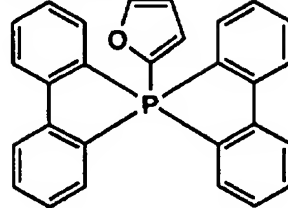
A2-4-1



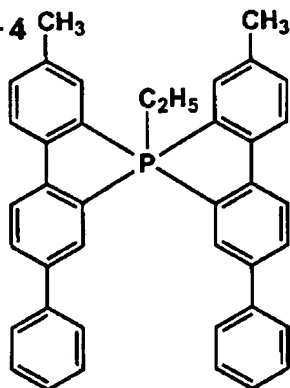
A2-4-2



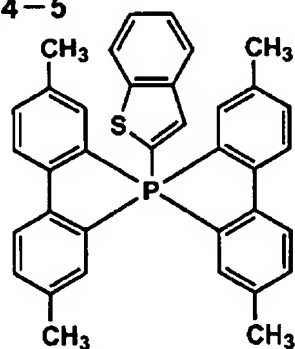
A2-4-3



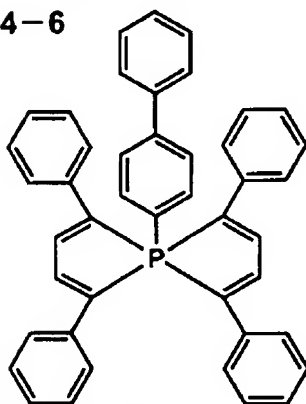
A2-4-4



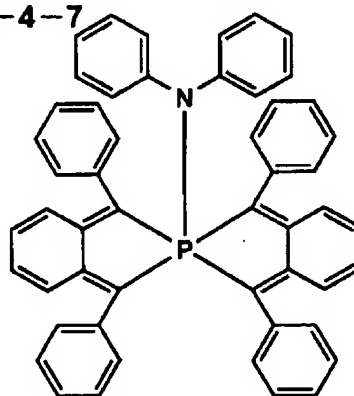
A2-4-5



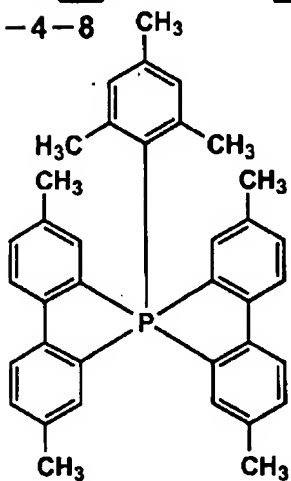
A2-4-6



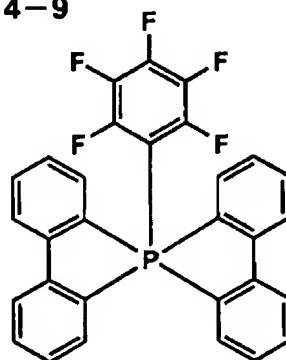
A2-4-7



A2-4-8



A2-4-9



[0105] This invention persons found out that the luminescence luminosity and the life of an element were improved, when one layer of the phosphorescence emission elements was made to contain the compound which has a phosphorus atom in a molecule as a result of repeating examination wholeheartedly about the material for phosphorescence emission and an organic electroluminescence element was produced.

[0106] The compound concerning this invention is a compound which contains the phosphorus atom in a molecule, and is a compound preferably shown in general formula (A2-5) - (A2-7) and aforementioned general formula (A2-1) - (A2-4).

[0107] In a general formula (A2-5), P expresses a phosphorus atom and  $R_{51}$ ,  $R_{52}$ , and  $R_{53}$  express the substituent of 1 value. The substituent same as a substituent of 1 value as  $R_{11}$  in a general formula (A2-1) -  $R_{15}$  is mentioned. Preferably, it is a time of all of  $R_{51}$ ,  $R_{52}$ , and  $R_{53}$  being aromatic series machines.

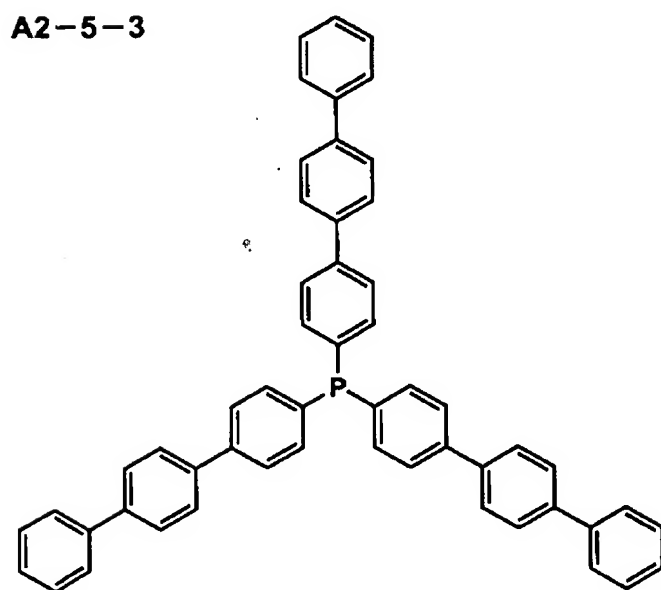
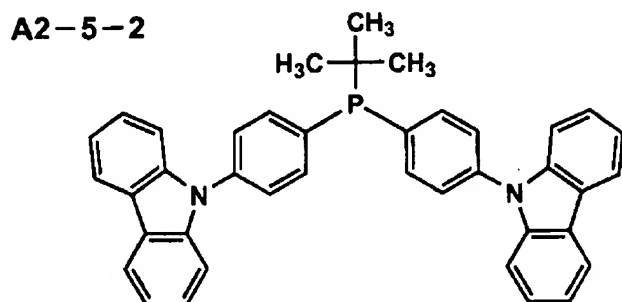
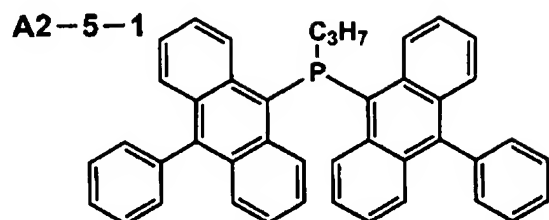
[0108] Next, a general formula (A2-6) is explained. P expresses a phosphorus atom,  $R_{61}$  expresses the substituent of 1 value, and  $X_{61}$ ,  $X_{62}$ ,  $X_{63}$ , and  $X_{64}$  express a nitrogen atom or C- $R_{62}$ , respectively. when the plurality of  $X_{61}$ ,  $X_{62}$ ,  $X_{63}$ , and  $X_{64}$  is denoted by C- $R_{62}$ , each may be the same or may differ.  $R_{62}$  expresses the substituent of 1 value. The substituent same as a substituent of 1 value as  $R_{11}$  in a general formula (A2-1) -  $R_{15}$  is mentioned. It is a time of being expressed with a general formula (A2-7) preferably, and is a time of  $R_{71}$  in a general formula (A2-7) being an aromatic series machine more preferably.

[0109] Although the example of a concrete compound is shown below, the phosphorus compounds concerning this invention are not limited to these.

[0110]



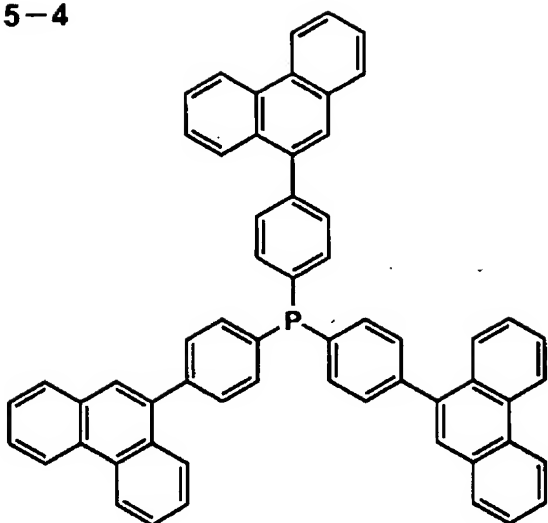
[Chemical formula 163]



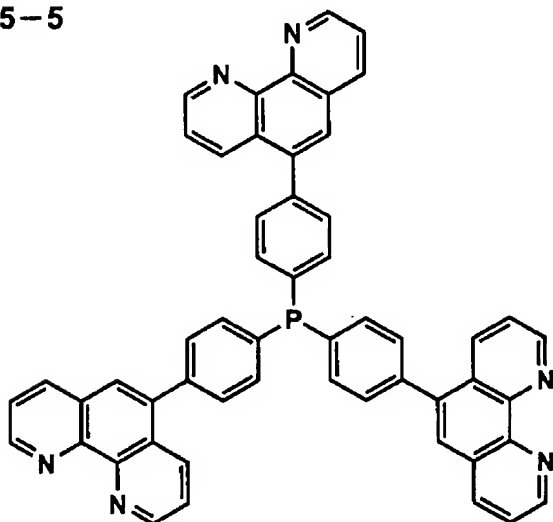
[0111]

[Chemical formula 164]

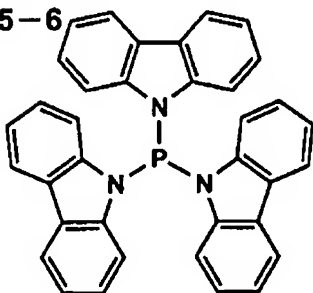
A2-5-4



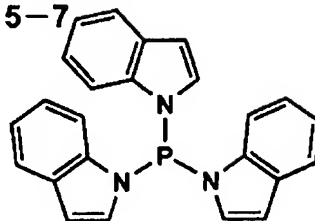
A2-5-5



A2-5-6



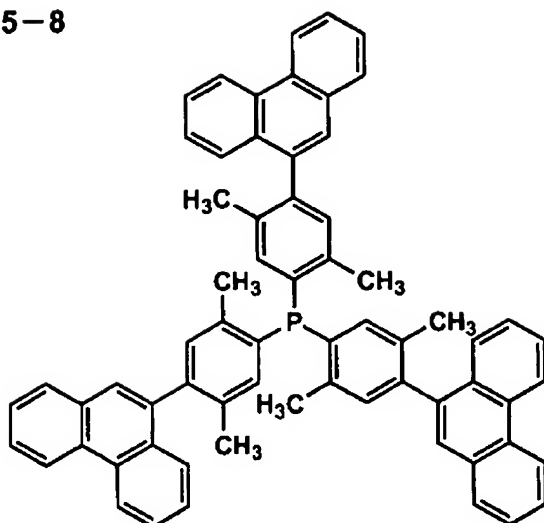
A2-5-7



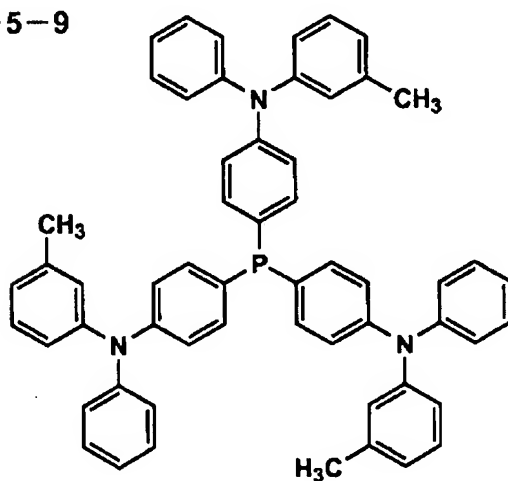
[0112]

[Chemical formula 165]

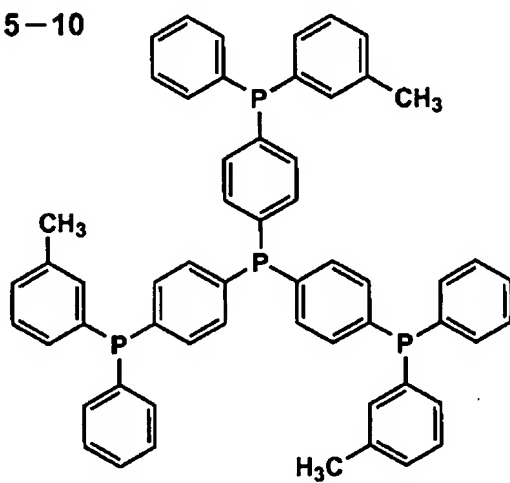
A2-5-8



A2-5-9



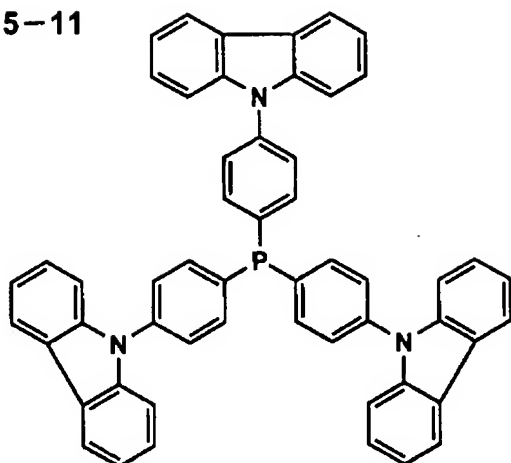
A2-5-10



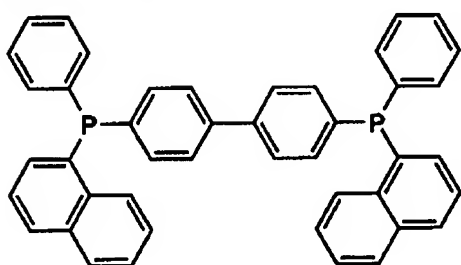
[0113]

[Chemical formula 166]

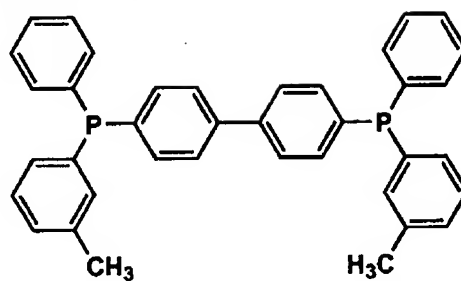
A2-5-11



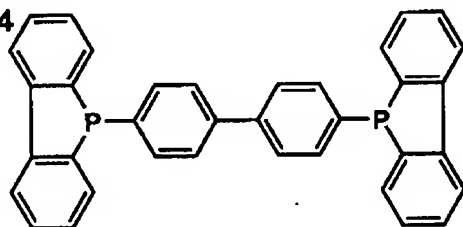
A2-5-12



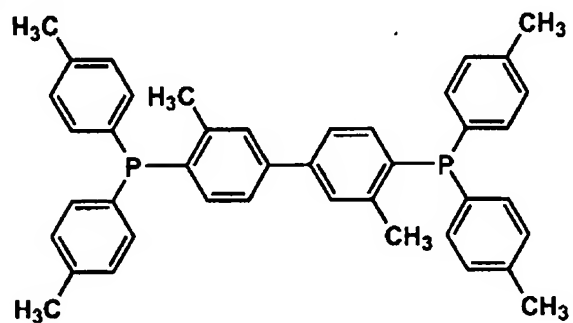
A2-5-13



A2-5-14

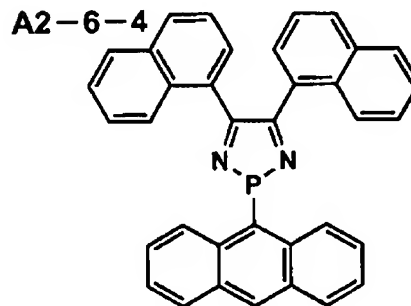
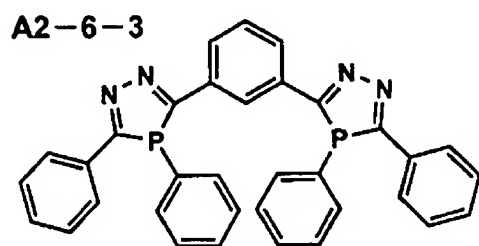
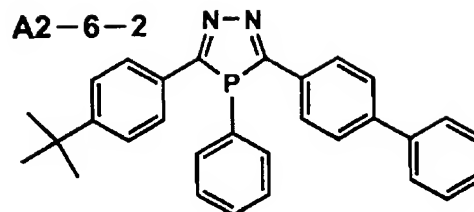
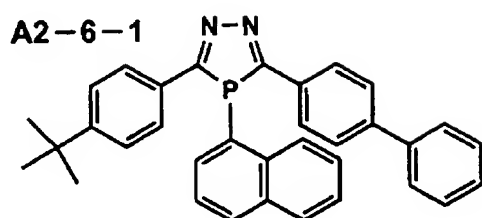


A2-5-15



[0114]

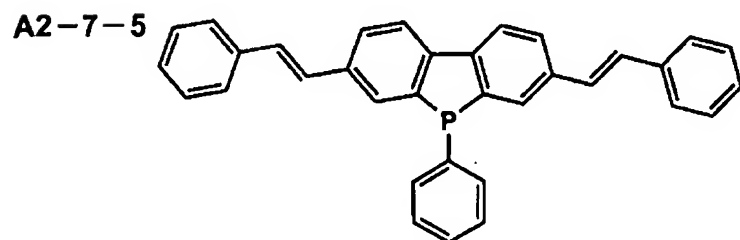
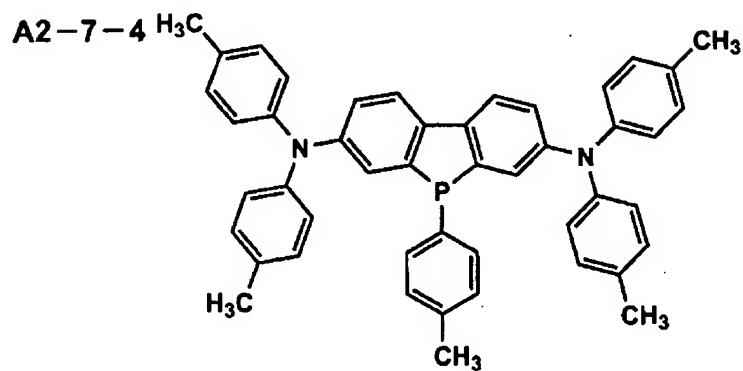
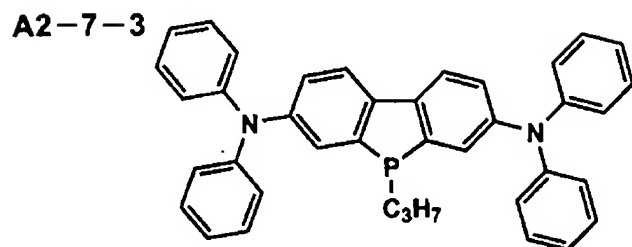
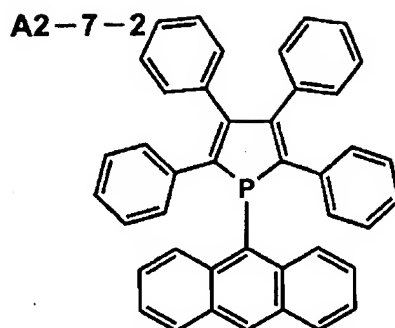
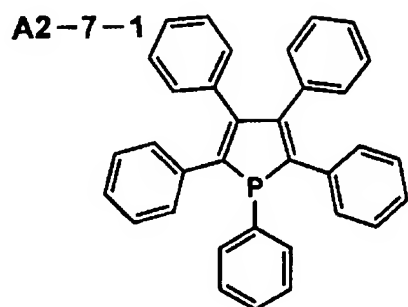
[Chemical formula 167]



[0115]

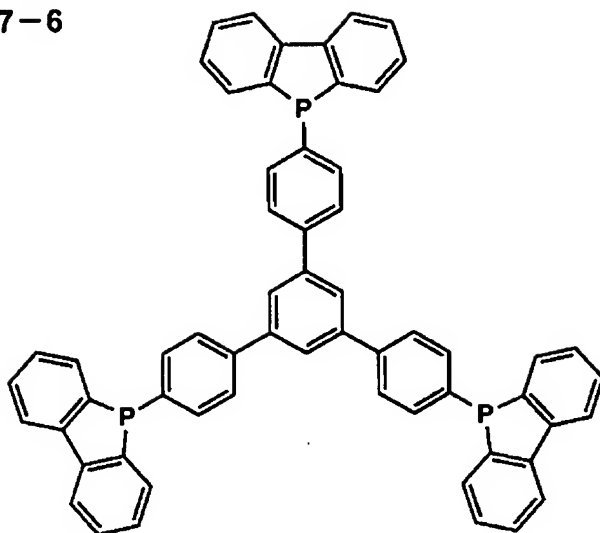
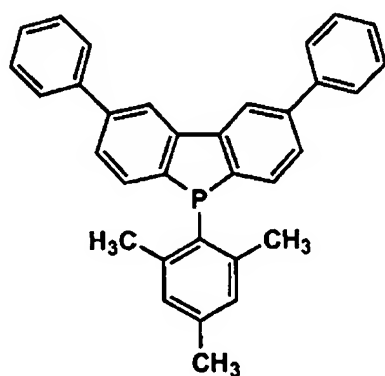


[Chemical formula 168]



[0116]

[Chemical formula 169]

**A2-7-6****A2-7-7**

[0117]The compound denoted by the general formula (B1-1), the general formula (B1-6), the

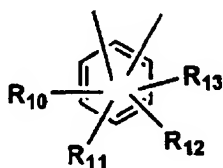
general formula (B1-11), and a general formula (B1-13) below is explained in detail.

[0118] In a general formula (B1-1). [  $R_1 - R_4$  of each ] the alkyl group (a methyl group, an ethyl group, and i-propyl group.) which is not replaced [ a hydrogen atom, substitution, or ] A hydroxyethyl machine, a methoxymethyl machine, a trifluoromethyl group, t-butyl group, etc., cycloalkyl machines (a cyclopropyl group, a cyclohexyl group, etc.) and an alkoxy group (a methoxy group.) halogen atoms (a fluoride atom.), such as an ethoxy basis, i-propoxy group, and a butoxy machine Expressing any one basis among chlorine atoms etc.,  $Ar_1$  expresses a divalent aromatic hydrocarbon machine, and expresses any one basis preferably among a general formula (B1-3), a general formula (B1-4), and a general formula (B1-5).

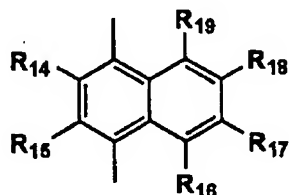
[0119]

[Chemical formula 170]

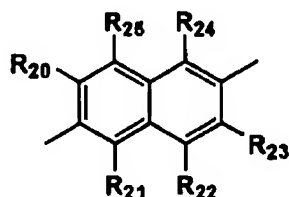
一般式(B1-3)



一般式(B1-4)



一般式(B1-5)

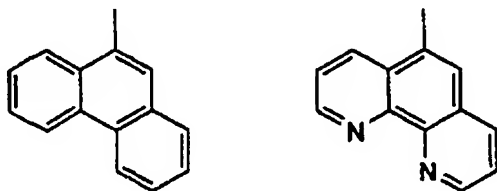


[0120]Ar<sub>2</sub> expresses the aryl group denoted by a general formula (B1-2).

[0121]R<sub>9</sub> in a general formula (B1-2) The alkyl group which is not replaced [ a hydrogen atom, substitution, or ], Express any one basis among a cycloalkyl machine, an alkoxy group, or a halogen atom, and. [ R<sub>5</sub> - R<sub>9</sub> of each ] expressing a hydrogen atom or a substituent -- a substituent -- a halogen atom (a fluoride atom.) alkyl groups (methyl, ethyl, i-propyl, and hydroxyethyl.), such as a chlorine atom cycloalkyl machines (cyclopentyl.), such as methoxymethyl, trifluoromethyl, and t-butyl Aralkyl groups, such as cyclohexyl (Ben Jill, 2-FENECHIRU, etc.), An aryl group (a phenyl, Naff Chill, p-trill, p-chlorophenyl, etc.), An alkoxy group (methoxy and ethoxy \*\*i-propoxy, butoxy, etc.), Any one basis may be chosen among aryloxy groups (FENOKISHI etc.), a cyano group, and heterocyclic machines (pyrrole, pyrrolidyl, pyrazolyl, imidazolyl, pyridyl, benzimidazolyl, BENZU thiazolyl, benzoxazolyl, etc.), and these bases may be replaced further. It may combine with each other, the substituent of R<sub>5</sub>, R<sub>6</sub> and R<sub>6</sub>, R<sub>7</sub> and R<sub>7</sub>, R<sub>8</sub> and R<sub>8</sub>, and R<sub>9</sub> may form a ring, and a benzene ring may form a ring. (like 9-phenan thrill machine shown by the following-ization 171, and 9-phenan TORORIRU machine)

[0122]

[Chemical formula 171]



[0123]In a general formula (B1-3), a general formula (B1-4), and a general formula (B1-5).

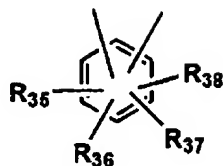
[  $R_{10}$  -  $R_{25}$  of each ] the alkyl group (a methyl group, an ethyl group, and i-propyl group.) which is not replaced [ a hydrogen atom, substitution, or ] A hydroxyethyl machine, a methoxymethyl machine, a trifluoromethyl group, t-butyl group, etc., cycloalkyl machines (a cyclo propyl group, a cyclohexyl group, etc.) and an alkoxy group (a methoxy group.) An ethoxy basis, i-propoxy group, a butoxy machine, etc. express any one basis among the aryl groups (a phenyl group, a naphthyl group, p-trill machine, p-chlorophenyl machine, a phenan thrill machine, an anthryl group, etc.) which are not replaced [ substitution or ] and halogen atoms (a fluoride atom, a chlorine atom, etc.).

[0124]In a general formula (B1-6). [  $R_{26}$  -  $R_{29}$  of each ] the alkyl group (a methyl group, an ethyl group, and i-propyl group.) which is not replaced [ a hydrogen atom, substitution, or ] A hydroxyethyl machine, a methoxymethyl machine, a trifluoromethyl group, t-butyl group, etc., cycloalkyl machines (a cyclo propyl group, a cyclohexyl group, etc.) and an alkoxy group (a methoxy group.) halogen atoms (a fluoride atom.), such as an ethoxy basis, i-propoxy group, and a butoxy machine Expressing any one basis among chlorine atoms etc.,  $Ar_3$  expresses a divalent aromatic hydrocarbon machine, and expresses any one divalent Ally Wren machine preferably among a general formula (B1-8), a general formula (B1-9), and a general formula (B1-10).

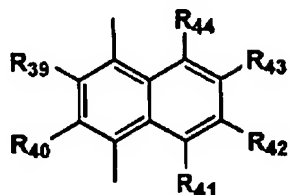
[0125]

[Chemical formula 172]

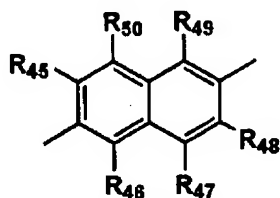
## 一般式(B1-8)



## 一般式(B1-9)



## 一般式(B1-10)



[0126]Ar<sub>4</sub> expresses the aryl group denoted by a general formula (B1-7).

[0127]R<sub>34</sub> in a general formula (B1-7) The alkyl group which is not replaced [ a hydrogen atom, substitution, or ], Express any one of a cycloalkyl machine, an alkoxy group, or halogen atoms, and. [ R<sub>30</sub> - R<sub>33</sub> of each ] Express a hydrogen atom or a substituent and, [ as a substituent ] halogen atoms (a fluoride atom, a chlorine atom, etc.) and an alkyl group (methyl and ethyl.) i-propyl, hydroxyethyl, methoxymethyl, trifluoromethyl, Cycloalkyl machines, such as t-butyl (cyclopentyl, cyclohexyl, etc.), aralkyl groups (Ben Jill, 2-FENECHIRU, etc.) and an aryl group (a phenyl.) alkoxy groups (methoxy one.), such as Naff Chill, p-trill, and p-chlorophenyl Aryloxy groups, such as ethoxy \*\*i-propoxy and butoxy one (FENOKISHI etc.), These bases may be further replaced by any one basis among a cyano group and heterocyclic machines (pyrrole, pyrrolidyl, pyrazolyl, imidazolyl, pyridyl, benzimidazolyl, BENZU thiazolyl, benzoxazolyl, etc.). It may combine with each other, the substituent of R<sub>30</sub>, R<sub>31</sub> and R<sub>31</sub>, R<sub>32</sub> and R<sub>32</sub>, R<sub>33</sub> and R<sub>33</sub>,

and  $R_{34}$  may form a ring, and a benzene ring may form a condensed ring.

[0128] In a general formula (B1-8), a general formula (B1-9), and a general formula (B1-10). [  $R_{35} - R_{50}$  of each ] the alkyl group (a methyl group, an ethyl group, and i-propyl group.) which is not replaced [ a hydrogen atom, substitution, or ] A hydroxyethyl machine, a methoxymethyl machine, a trifluoromethyl group, t-butyl group, etc., cycloalkyl machines (a cyclo propyl group, a cyclohexyl group, etc.) and an alkoxy group (a methoxy group.) An ethoxy basis, i-propoxy group, a butoxy machine, etc. express any one basis among the aryl groups (a phenyl group, a naphthyl group, p-trill machine, p-chlorophenyl machine, a phenan thrill machine, an anthryl group, etc.) which are not replaced [ substitution or ] or halogen atoms (a fluoride atom, a chlorine atom, etc.).

[0129] In a general formula (B1-11). [  $R_{82} - R_{85}$  of each ] the alkyl group (a methyl group, an ethyl group, and i-propyl group.) which is not replaced [ a hydrogen atom, substitution, or ] A hydroxyethyl machine, a methoxymethyl machine, a trifluoromethyl group, t-butyl group, etc., cycloalkyl machines (a cyclo propyl group, a cyclohexyl group, etc.) and an alkoxy group (a methoxy group.) An ethoxy basis, i-propoxy group, a butoxy machine, etc. express any one basis among halogen atoms (a fluoride atom, a chlorine atom, etc.), and  $X_1$  expresses the aryl group denoted by a general formula (B1-12). in a general formula (B1-12) --  $R_{86}$  -- an alkyl group (methyl.) Ethyl, i-propyl, hydroxyethyl, methoxymethyl, trifluoromethyl, t-butyl etc. express any one substituent among alkoxy groups (methoxy and ethoxy \*\*i-propoxy, butoxy, etc.) and halogen atoms (a fluoride atom, a chlorine atom, etc.), and express a methyl group, a trifluoromethyl group, and a fluoride atom preferably.  $R_{87} - R_{89}$  -- the alkyl group (a methyl group.) which is not replaced [ each, a hydrogen atom, substitution, or ] An ethyl group, i-propyl group, a hydroxyethyl machine, a methoxymethyl machine, cycloalkyl machines (a cyclo propyl group.), such as a trifluoromethyl group and t-butyl group alkoxy groups (a methoxy group, an ethoxy basis, and i-propoxy group.), such as a cyclohexyl group A butoxy machine etc. express any one of the aryl groups (a phenyl group, a naphthyl group, p-trill machine, p-chlorophenyl machine, a phenan thrill machine, an anthryl group, etc.) which are not replaced [ substitution or ] or halogen atoms (a fluoride atom, a chlorine atom, etc.).  $Ar_8$  expresses an aromatic hydrocarbon machine and, [ as an aromatic hydrocarbon machine ] A phenyl group, a naphthyl group, p-trill machine, p-chlorophenyl machine, a phenan thrill machine, an anthryl group, etc. are mentioned, they may have a substituent further, it may combine with each other

and the substituent which adjoins among those substituents may form the ring. 1-naphthyl group and 9-phenanthrene are expressed preferably.

[0130] In a general formula (B1-13). [  $R_{90} - R_{93}$  of each ] the alkyl group (a methyl group, an ethyl group, and i-propyl group.) which is not replaced [ a hydrogen atom, substitution, or ] A hydroxyethyl machine, a methoxymethyl machine, a trifluoromethyl group, t-butyl group, etc., cycloalkyl machines (a cyclopropyl group, a cyclohexyl group, etc.) and an alkoxy group (a methoxy group.) An ethoxy basis, i-propoxy group, a butoxy machine, etc. express any one basis among halogen atoms (a fluoride atom, a chlorine atom, etc.), and  $X_2$  expresses the aryl group denoted by a general formula (14). in a general formula (B1-14) --  $R_{94}$  -- an alkyl group (methyl.) Ethyl, i-propyl, hydroxyethyl, methoxymethyl, trifluoromethyl, t-butyl etc. express any one substituent among alkoxy groups (methoxy and ethoxy \*\*i-propoxy, butoxy, etc.) and halogen atoms (a fluoride atom, a chlorine atom, etc.), and express a methyl group, a trifluoromethyl group, and a fluoride atom preferably.  $R_{95} - R_{97}$  -- the alkyl group (a methyl group.) which is not replaced [ each, a hydrogen atom, substitution, or ] An ethyl group, i-propyl group, a hydroxyethyl machine, a methoxymethyl machine, cycloalkyl machines (a cyclopropyl group.), such as a trifluoromethyl group and t-butyl group alkoxy groups (a methoxy group, an ethoxy basis, and i-propoxy group.), such as a cyclohexyl group A butoxy machine etc. express any one of the aryl groups (a phenyl group, a naphthyl group, p-trill machine, p-chlorophenyl machine, a phenanthrene machine, an anthryl group, etc.) which are not replaced [ substitution or ] or halogen atoms (a fluoride atom, a chlorine atom, etc.).  $Ar_9$  expresses an aromatic hydrocarbon machine and, [ as an aromatic hydrocarbon machine ] A phenyl group, a naphthyl group, p-trill machine, p-chlorophenyl machine, a phenanthrene machine, an anthryl group, etc. are mentioned, they may have a substituent further, it may combine with each other and the substituent which adjoins among those substituents may form the ring. 1-naphthyl group and 9-phenanthrene are expressed preferably.

[0131] Next, the typical synthetic example of a compound denoted by a general formula (B1-1), (B1-6), (B1-11), and (B1-13) is described.

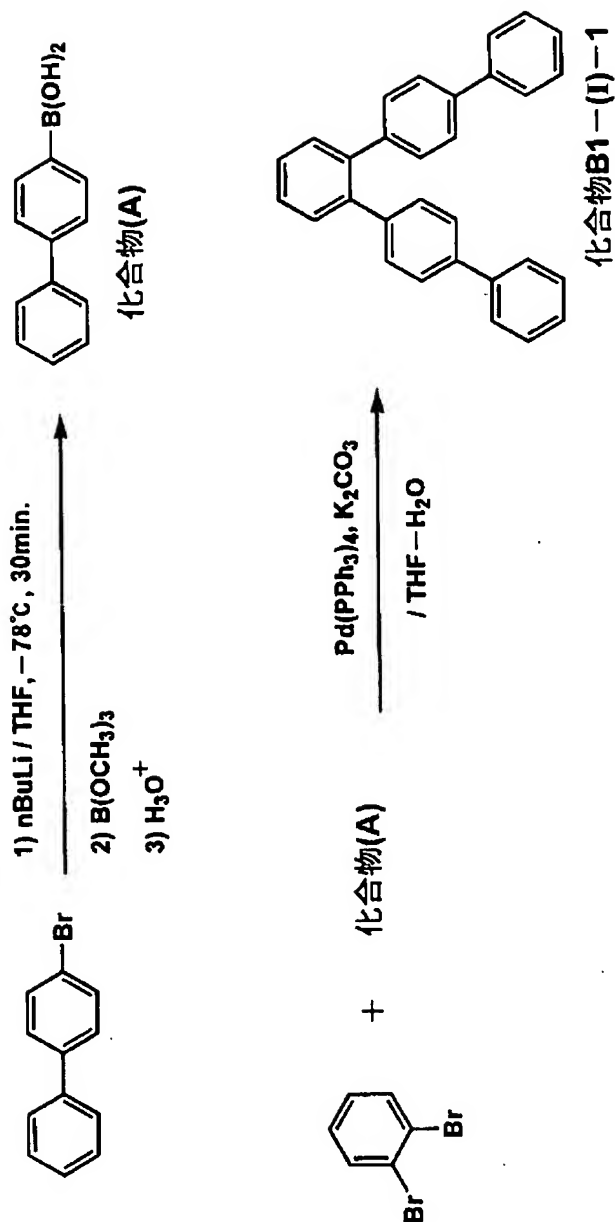
[0132] Composition of [synthetic example] compound B1-(I)-1



[0133]

[Chemical formula 173]

合成例



[0134]4-bromo biphenyl 13.3g is dissolved in 150 ml of drying-under nitrogen atmosphere tetrahydro frans, -After 57.1 ml of n-butyl lithium hexane (1.5 M/L) solution was dropped at 78 \*\* and 50 ml of tetrahydro franc solution of 12.8 ml of trimethoxy BORAN was dropped after 30-minute churning, acid was added to reaction solution and it was made pH=2. 8.62g (76% of \*\*\*\*) of compounds (A) were obtained for reaction solution as extraction, dryness, concentration, and re-crystallizing.

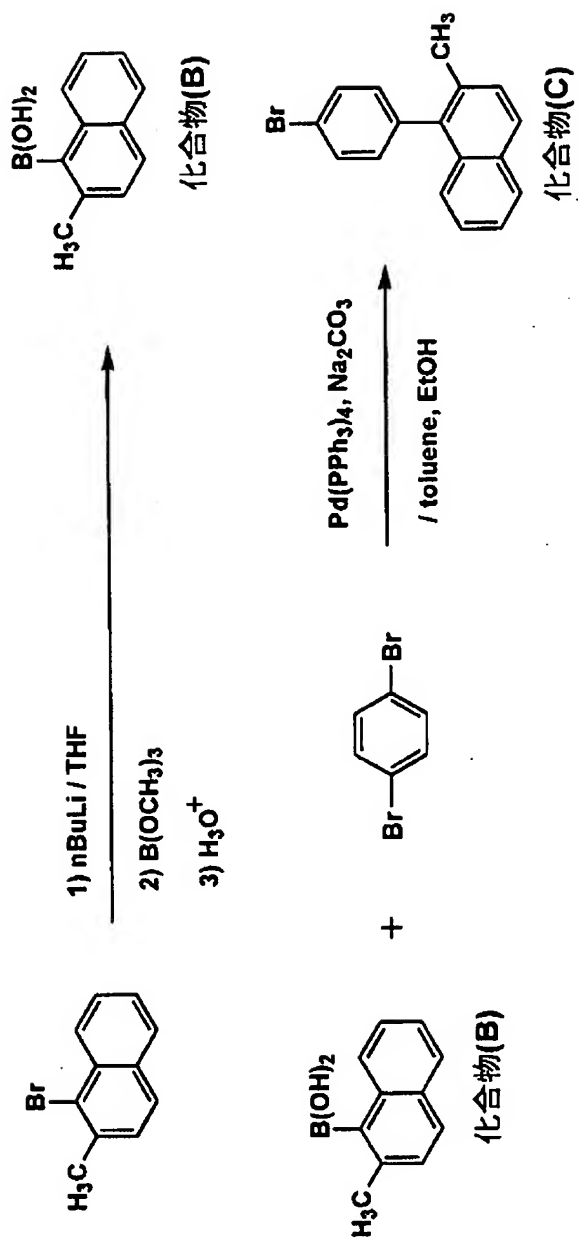
[0135]next, a compound (A) -- among the solvent of a tetrahydro franc water two-layer system, [g / 3.44 /, 1, and 2-dibromo benzene 1.86g ] Compound B1-(I)-1 [ 1.96g (65% of \*\*\*\*) ] was obtained by flowing back for 20 hours under the existence of the potassium carbonate 2.18g and 910 mg of tetrakistriphenyl phosphinepalladium.

[0136]Composition of [synthetic example] compound B1-(II)-32

[0137]

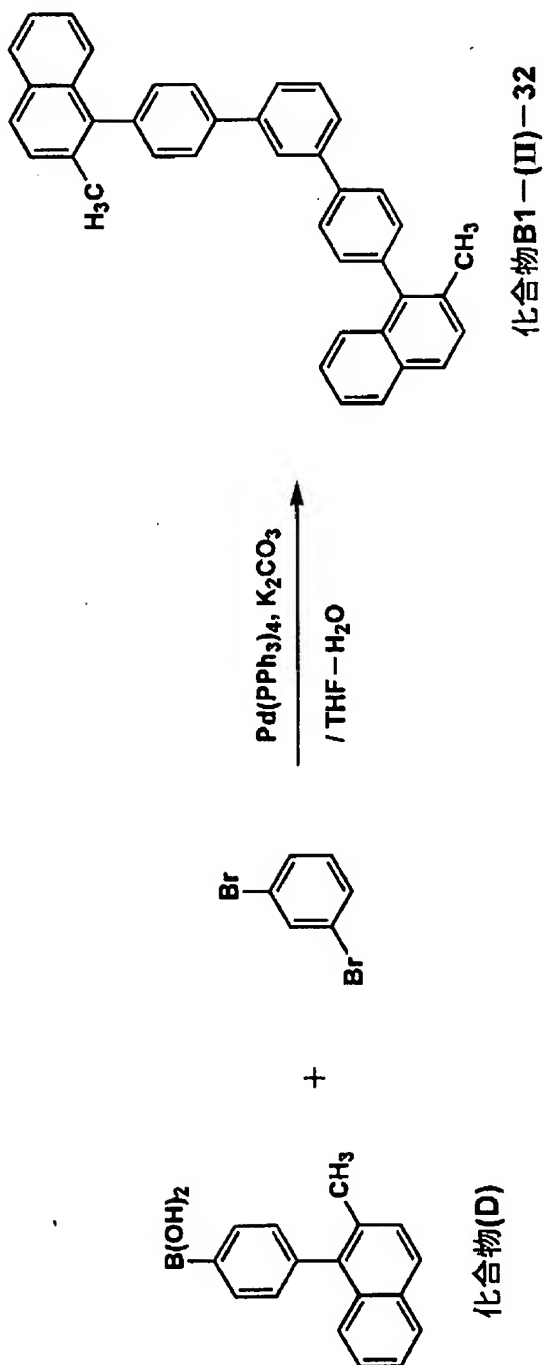
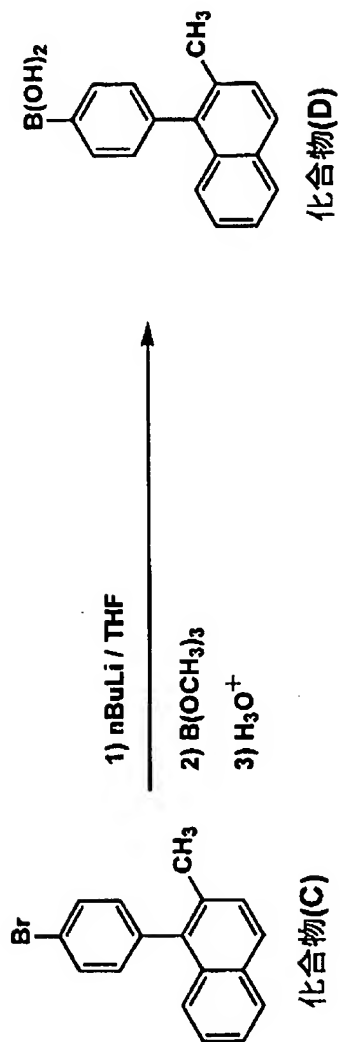
[Chemical formula 174]

合成例



[0138]

[Chemical formula 175]



[0139] 20.0 g of 1-bromo 2-methylnaphthalene is dissolved in 100 ml of drying-under nitrogen atmosphere tetrahydro frans, -After 90.5 ml of n-butyl lithium hexane (1.5 M/L) solution was dropped at 78 °C and 100 ml of tetrahydro franc solution of 23.2 ml of trimethoxy BORAN was dropped after 30-minute churning, acid was added to reaction solution and it was made pH=2. 9.41g (56% of \*\*\*\*) of compounds (B) were obtained for reaction solution as extraction, dryness, concentration, and re-crystallizing.

[0140] Compound (B)g [ 4.69 ], 1, and 4-dibromo benzene 11.9g was added to 60 ml of toluene, and the mixed solvent of 10 ml of ethanol, 25 ml of sodium carbonate solution of 300 mg of tetrakis(triphenyl phosphine)palladium and 2 M/L was added there, and it flowed back for 18 hours. Then, refining was obtained by extraction, dryness, and column chromatography, and 6.60g (88% of \*\*\*\*) of compounds (C) were obtained as re-crystallizing.

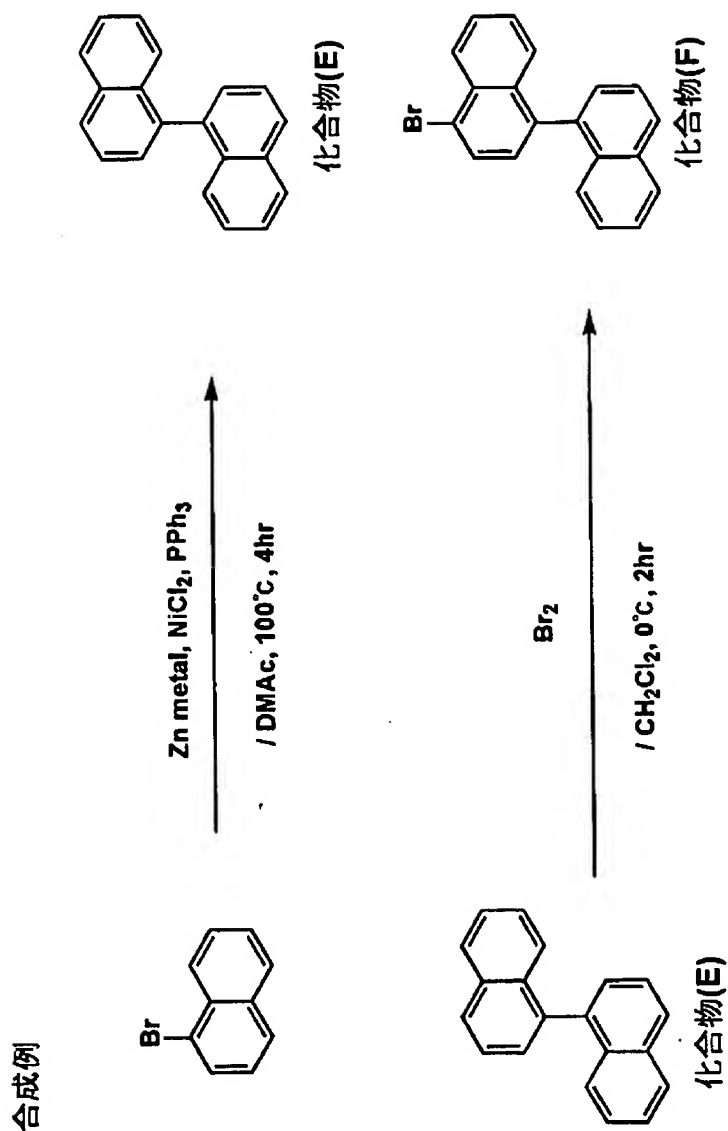
[0141] Next, 6.37 g of compounds (C) are dissolved in 50 ml of drying-under nitrogen atmosphere tetrahydro frans, -After 21.4 ml of n-butyl lithium hexane (1.5 M/L) solution was dropped at 78 °C and 20 ml of tetrahydro franc solution of 5.50 ml of trimethoxy BORAN was dropped after 30-minute churning, acid was added to reaction solution and it was made pH=2. 3.93g (70% of \*\*\*\*) of compounds (D) were obtained for reaction solution as extraction, dryness, concentration, and re-crystallizing.

[0142] Compound (D)g [ 3.14 ], 1, and 3-dibromo benzene 1.28g Inside of the solvent of a tetrahydro franc water two-layer system, Compound B1-(II)-32 [ 1.50g (54% of \*\*\*\*) ] were obtained by flowing back for 20 hours under the existence of the potassium carbonate 3.31g and 629 mg of tetrakis(triphenyl phosphine)palladium.

[0143] Composition of [synthetic example] compound B1-(II)-39

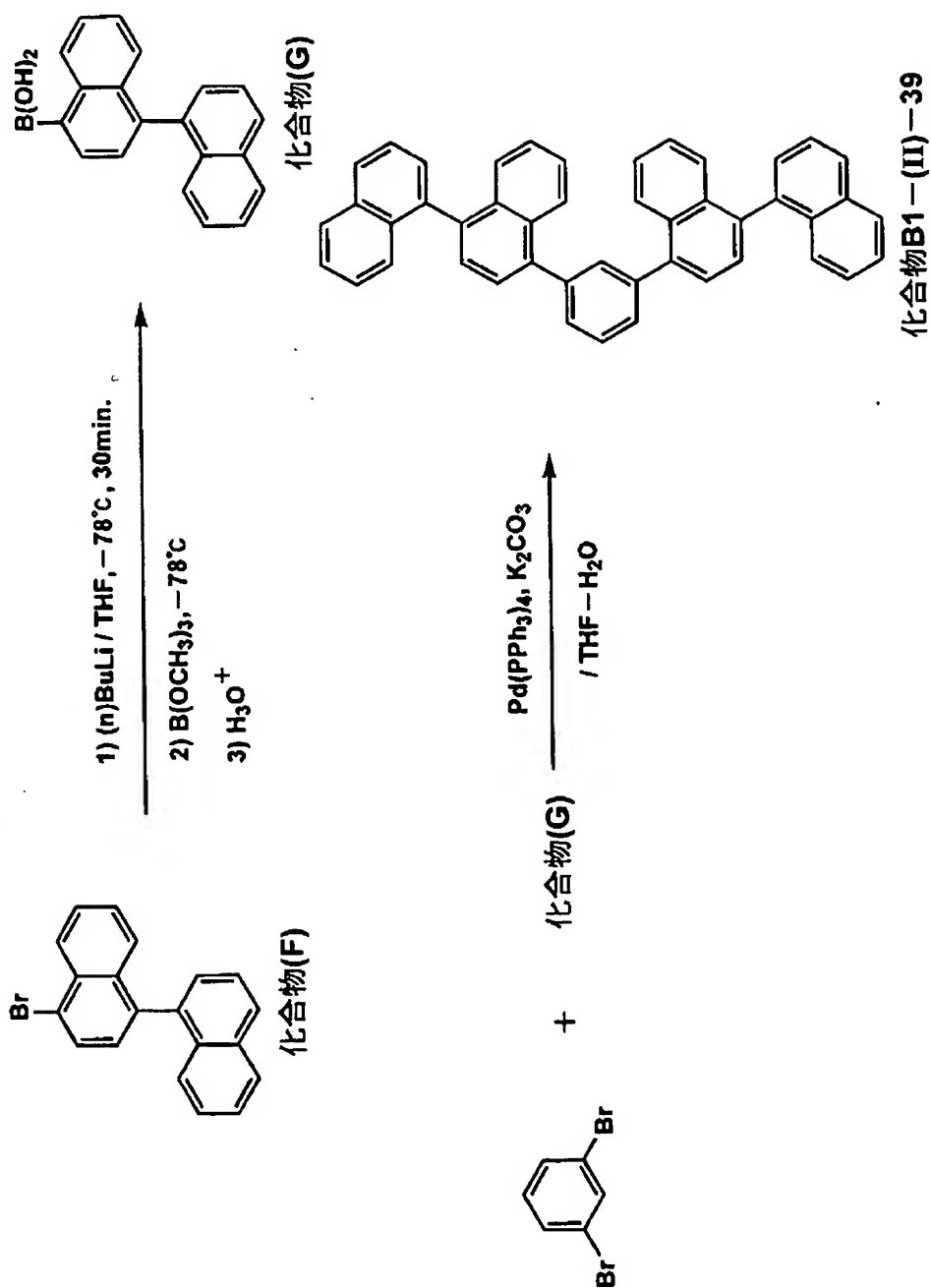
[0144]

[Chemical formula 176]



[0145]

[Chemical formula 177]





[0146]31.0 g of bird phenyl phosphine, the nickel chloride 7.65g, and the metal zinc 19.3g were added to 100 ml of drying-under nitrogen atmosphere JIMECHIRU acetone, and were heated under churning, and the solution which melted 61.1 g of 1-bromo NAFUCHIRU in 50 ml of drying JIMECHIRU acetone at 100 degrees was dropped. Then, heating churning was carried out at 100 degrees for 4 hours, and 84g (56%) of compounds (E) were obtained for reaction liquid as neutralization, extraction, dryness, concentration, and re-crystallizing.

[0147]Next, 70 g of compounds (E) were melted in 800 ml of methylene chlorides, and it ice-cooled, and it was dropped, carrying out reaction pursuit of the solution which melted the bromine 43.9g in 100 ml of methylene chlorides at 0 times with liquid chromatography. 79.2g (86% of \*\*\*\*) of compounds (F) were obtained for reaction liquid as washing, extraction, dryness, concentration, and re-crystallizing.

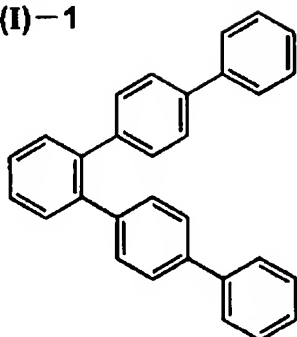
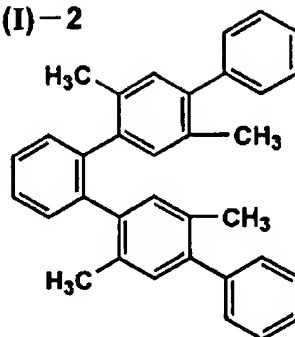
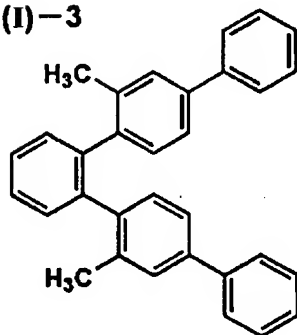
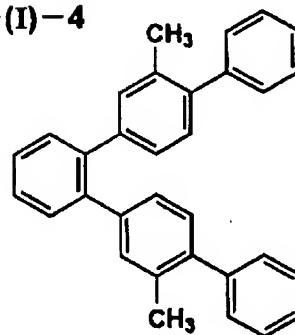
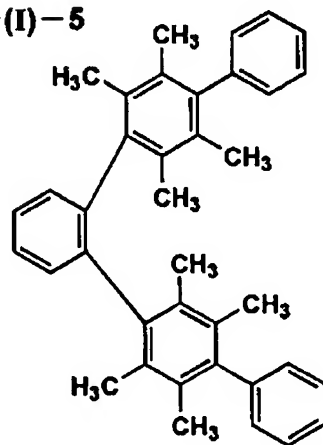
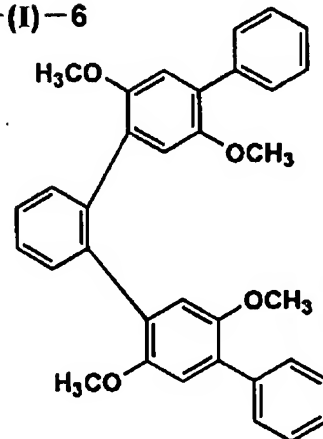
[0148]50 g of compounds (F) are dissolved in 200 ml of drying-under nitrogen atmosphere tetrahydro francs, -After 100 ml of n-butyl lithium hexane (1.5 M/L) solution was dropped at 78 \*\* and 30 ml of tetrahydro franc solution of 20 ml of trimethoxy BORAN was dropped after 30-minute churning, acid was added to reaction solution and it was made pH=2. 33.8g (76% of \*\*\*\*) of compounds (G) were obtained for reaction solution as extraction, dryness, concentration, and re-crystallizing.

[0149]Compound (G)g [ 4.47 ], 1, and 3-dibromo benzene 1.61g Inside of the solvent of a tetrahydro franc water two-layer system, Compound B1-(II)-39 [ 2.31g (58% of \*\*\*\*) ] were obtained by flowing back for 20 hours under the existence of the potassium carbonate 4.14g and 790 mg of tetrakis(triphenyl phosphine)palladium.

[0150]Although the example of a compound denoted by the general formula (B1-1) in this invention, (B1-6), (B1-11), and (B1-13) below is shown, this invention is not limited to these.

[0151]

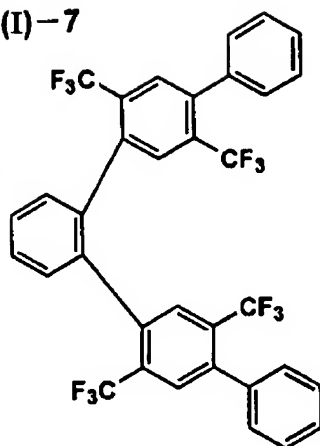
[Chemical formula 178]

**B1-(I)-1****B1-(I)-2****B1-(I)-3****B1-(I)-4****B1-(I)-5****B1-(I)-6**

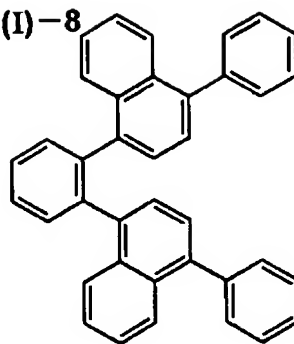
[0152]

[Chemical formula 179]

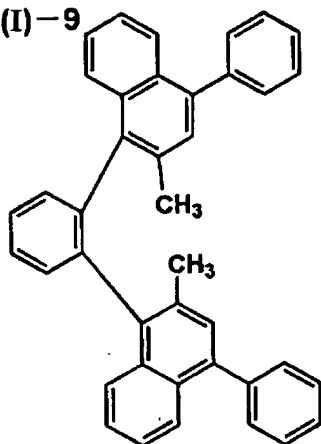
B1-(I)-7



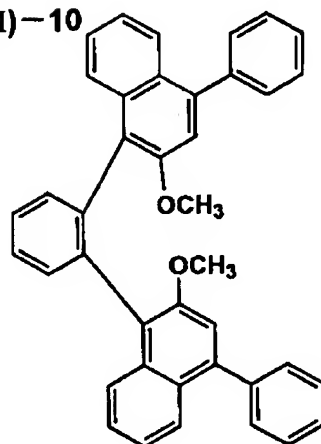
B1-(I)-8



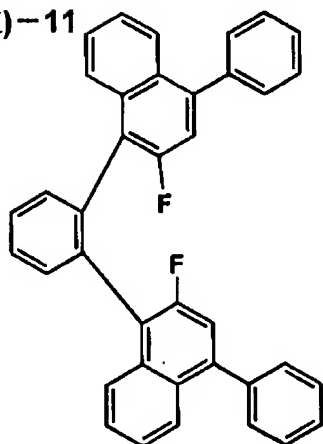
B1-(I)-9



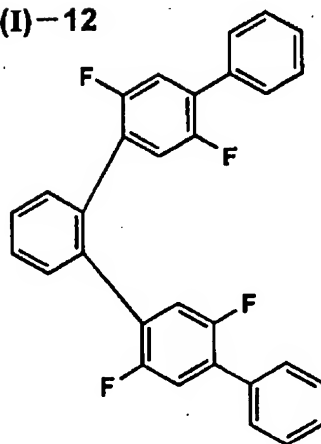
B1-(I)-10



B1-(I)-11

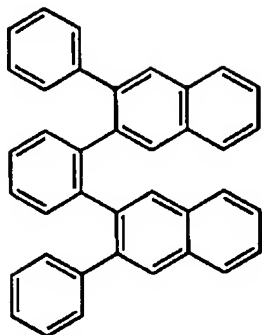
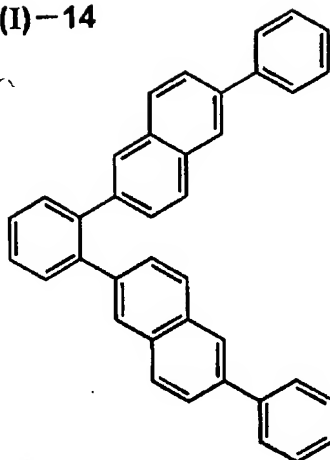
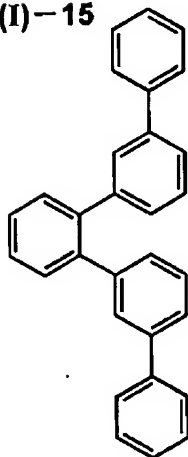
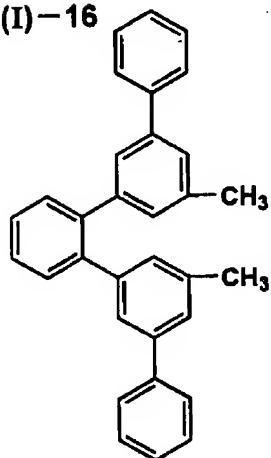
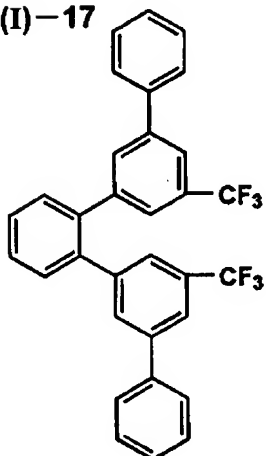
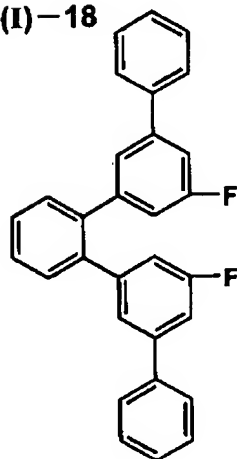


B1-(I)-12



[0153]

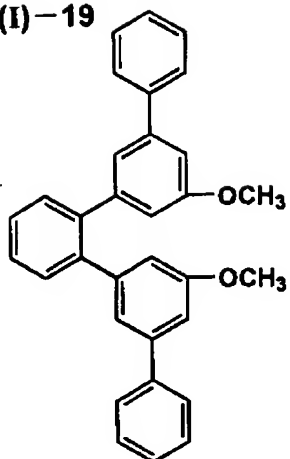
[Chemical formula 180]

**B1-(I)-13****B1-(I)-14****B1-(I)-15****B1-(I)-16****B1-(I)-17****B1-(I)-18**

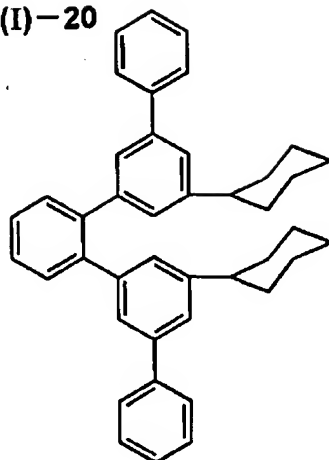
[0154]

[Chemical formula 181]

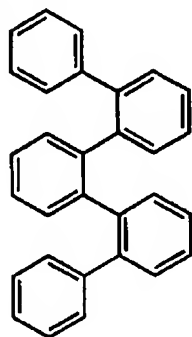
B1-(I)-19



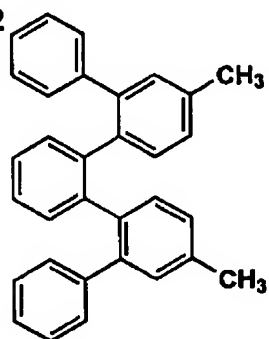
B1-(I)-20



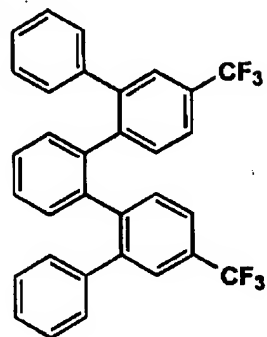
B1-(I)-21



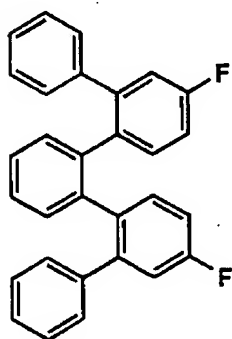
B1-(I)-22



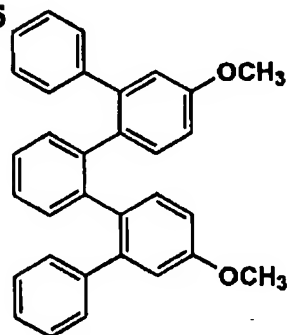
B1-(I)-23



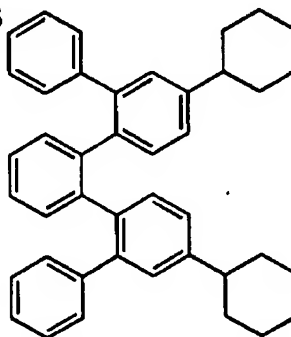
B1-(I)-24



B1-(I)-25



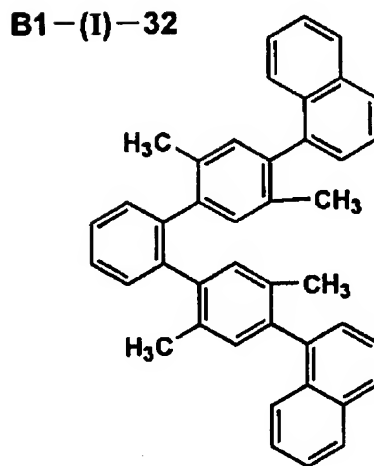
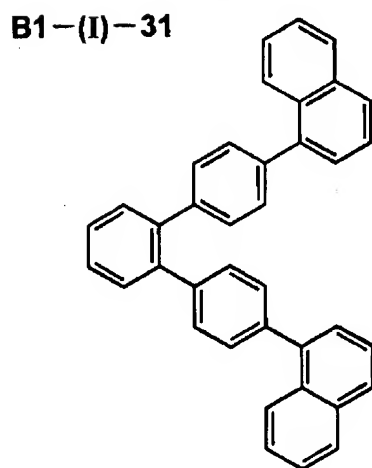
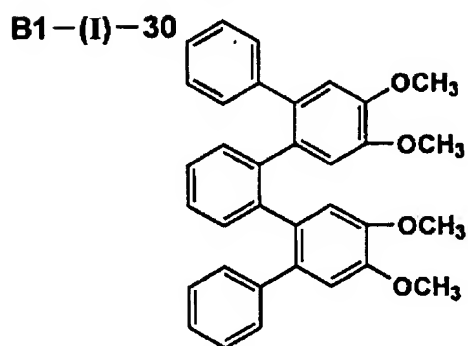
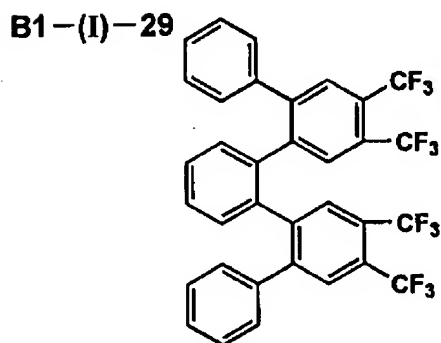
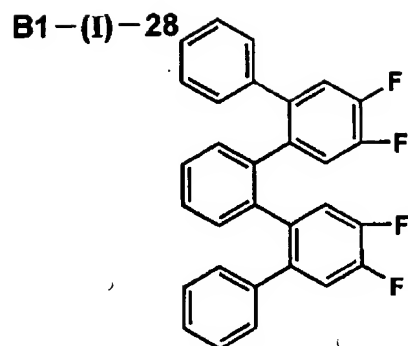
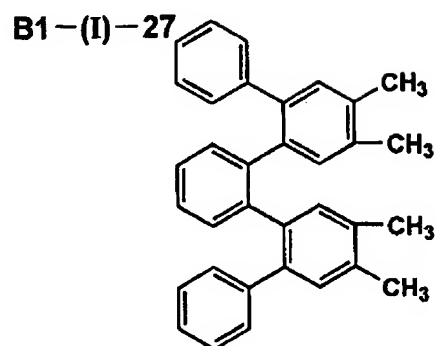
B1-(I)-26





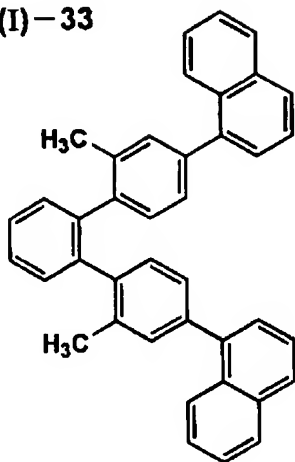
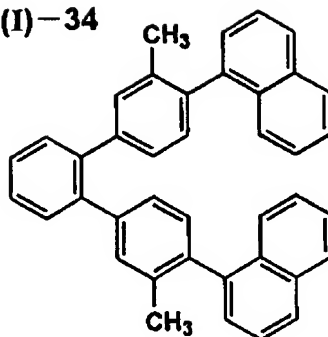
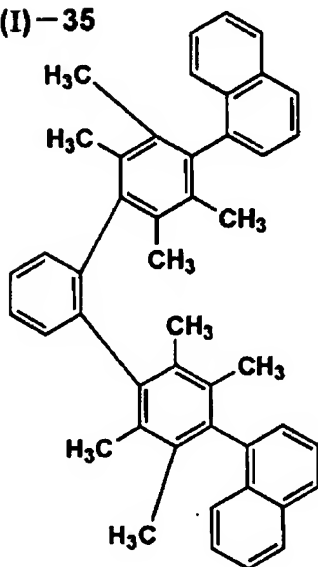
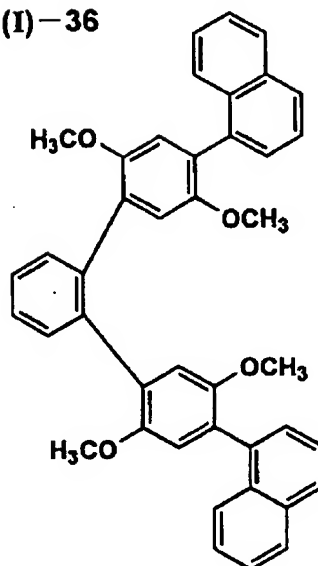
[0155]

[Chemical formula 182]



[0156]

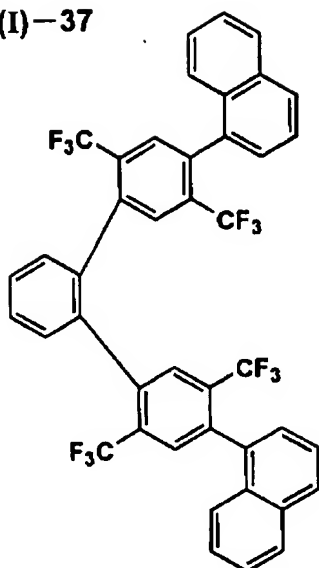
[Chemical formula 183]

**B1-(I)-33****B1-(I)-34****B1-(I)-35****B1-(I)-36**

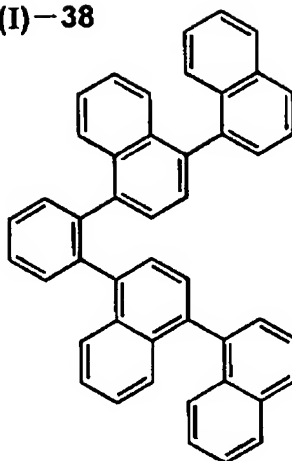
[0157]

[Chemical formula 184]

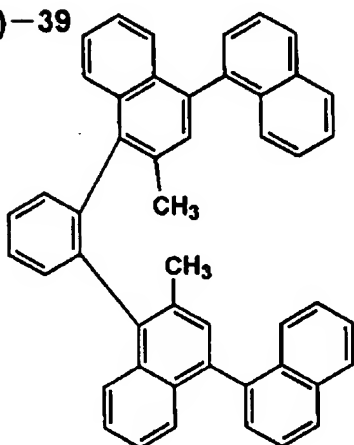
B1-(I)-37



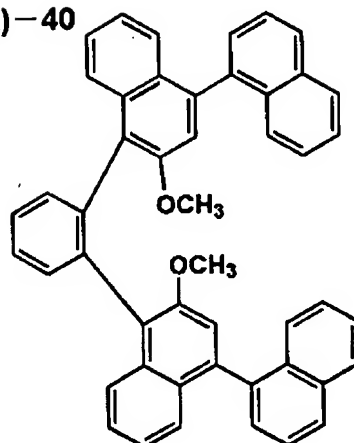
B1-(I)-38



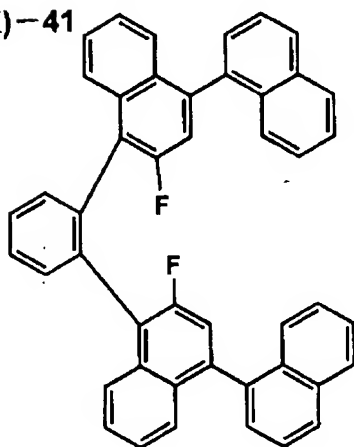
B1-(I)-39



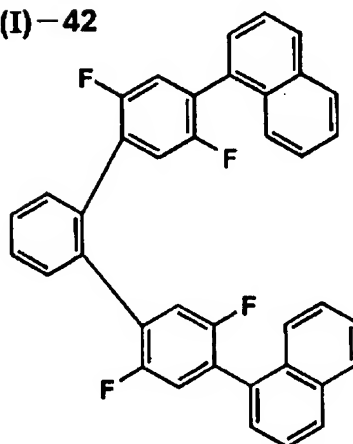
B1-(I)-40



B1-(I)-41

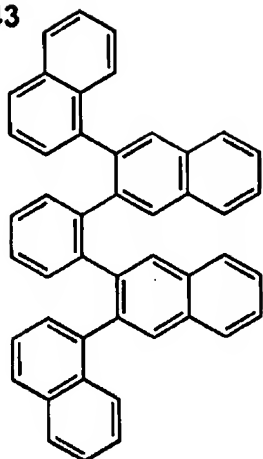
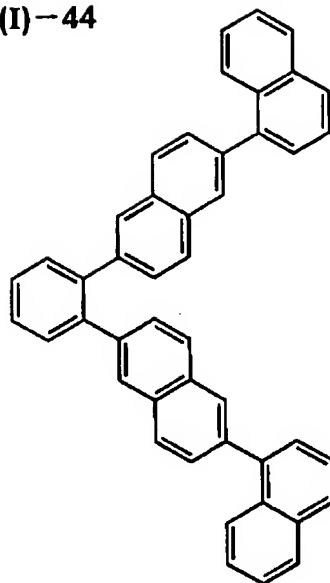
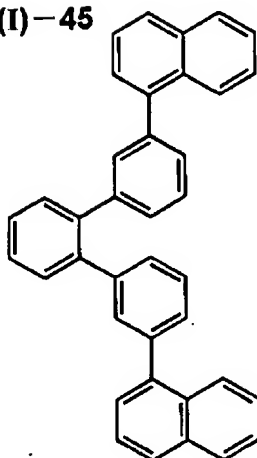
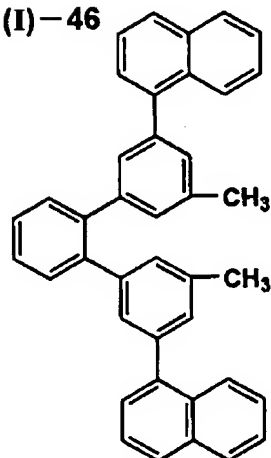
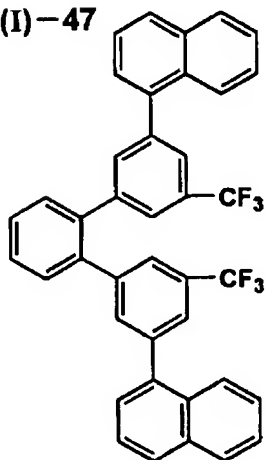
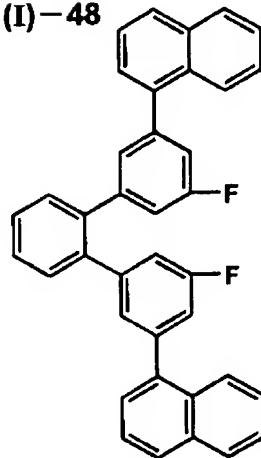


B1-(I)-42



[0158]

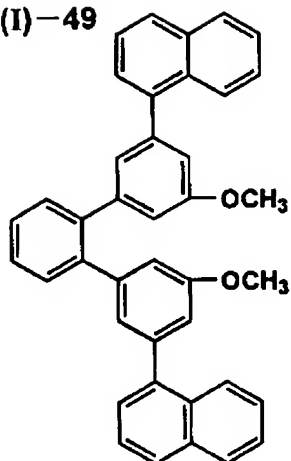
[Chemical formula 185]

**B1-(I)-43****B1-(I)-44****B1-(I)-45****B1-(I)-46****B1-(I)-47****B1-(I)-48**

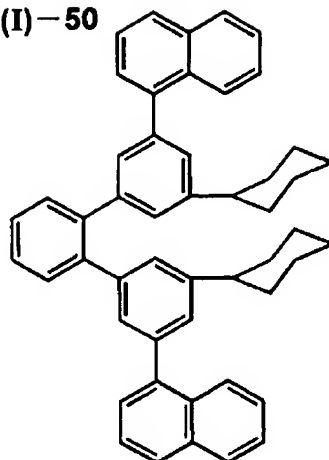
[0159]

[Chemical formula 186]

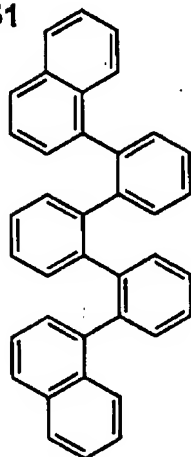
B1-(I)-49



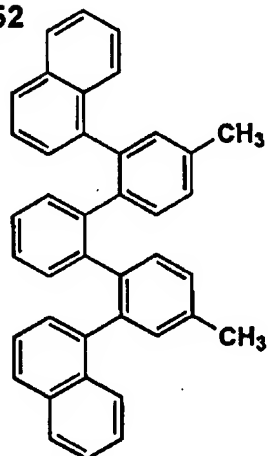
B1-(I)-50



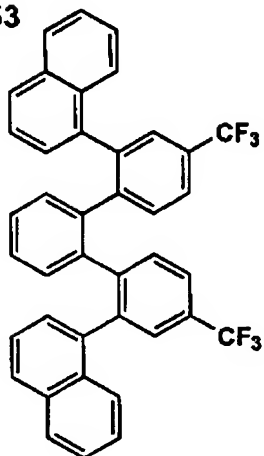
B1-(I)-51



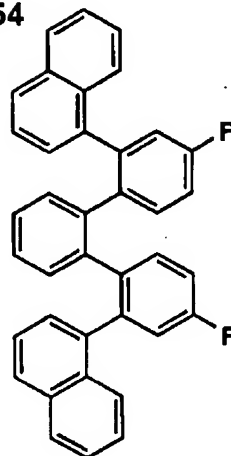
B1-(I)-52



B1-(I)-53



B1-(I)-54

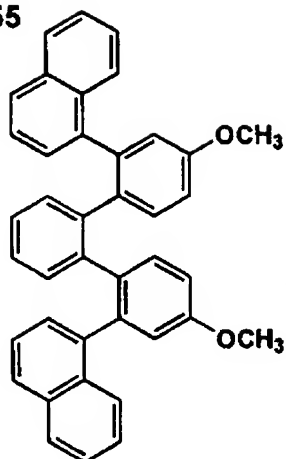




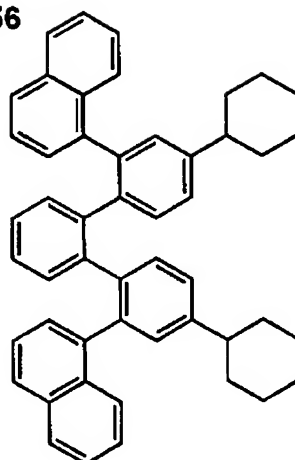
[0160]

[Chemical formula 187]

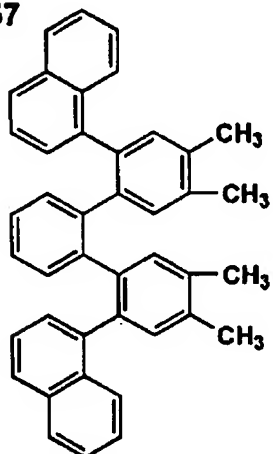
B1-(I)-55



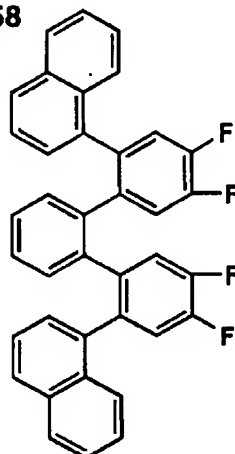
B1-(I)-56



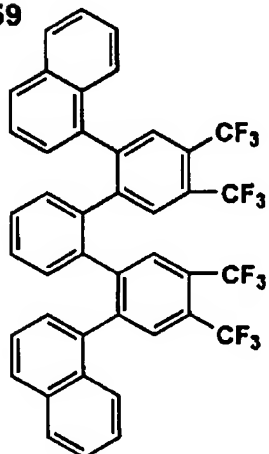
B1-(I)-57



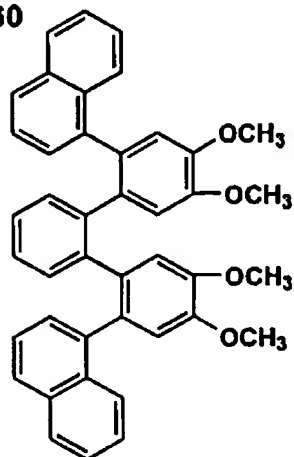
B1-(I)-58



B1-(I)-59

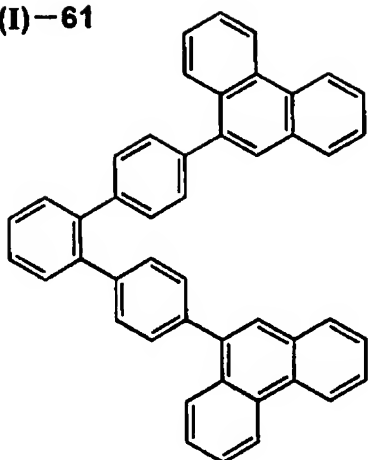
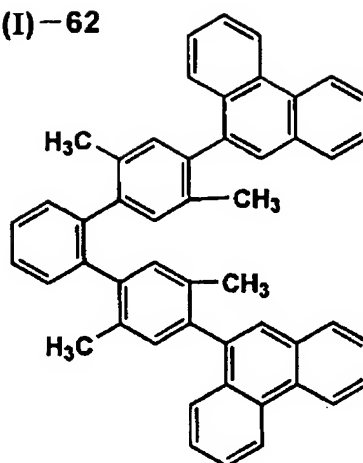
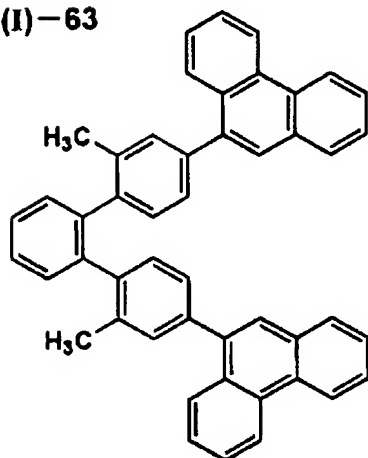
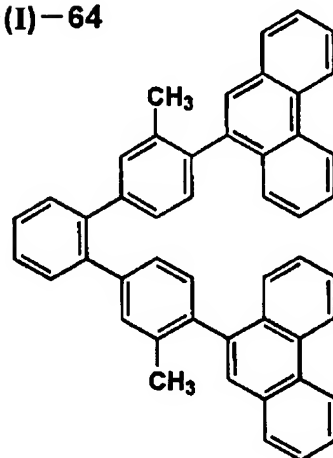
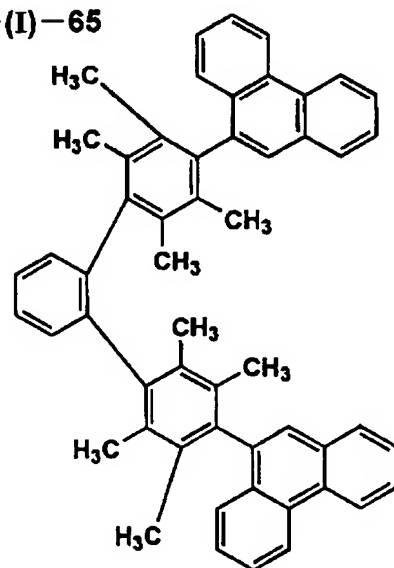
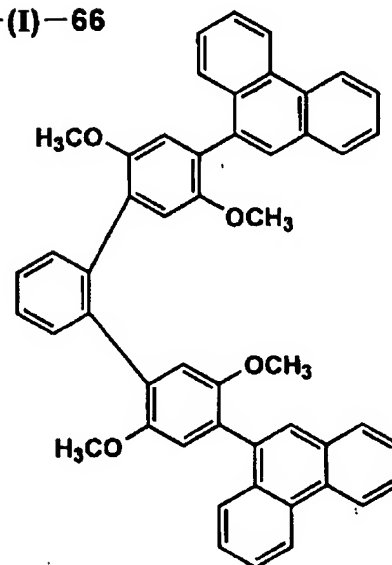


B1-(I)-60



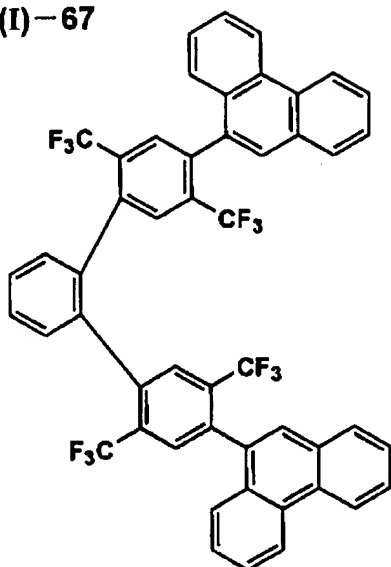
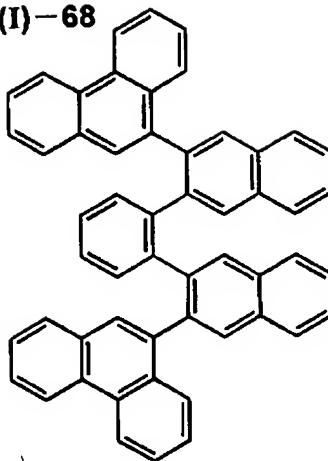
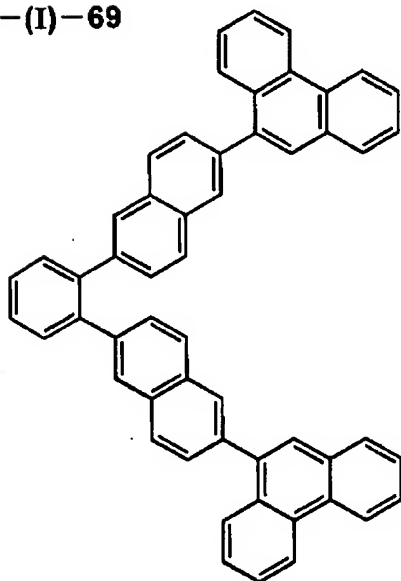
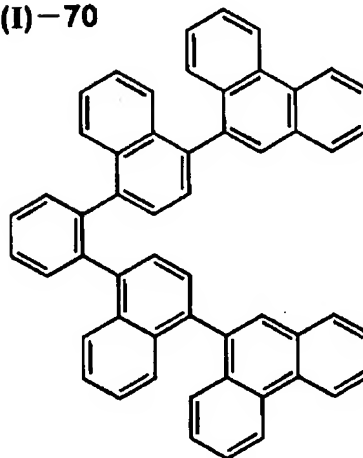
[0161]

[Chemical formula 188].

**B1-(I)-61****B1-(I)-62****B1-(I)-63****B1-(I)-64****B1-(I)-65****B1-(I)-66**

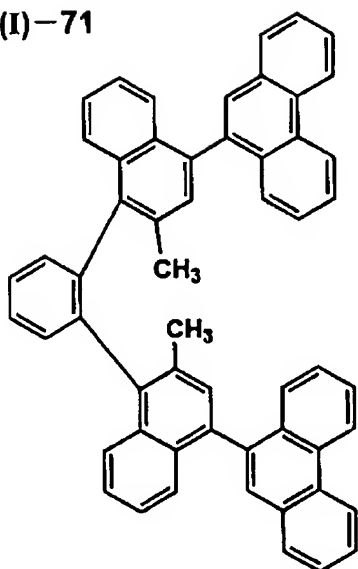
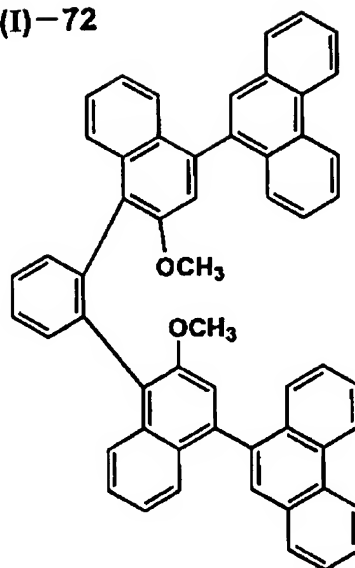
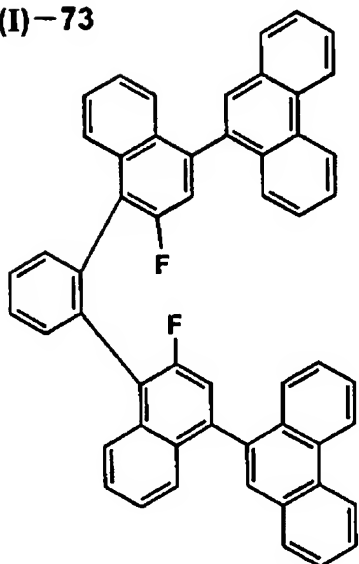
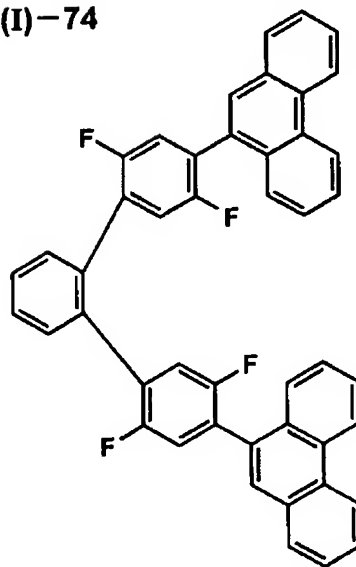
[0162]

[Chemical formula 189]

**B1-(I)-67****B1-(I)-68****B1-(I)-69****B1-(I)-70**

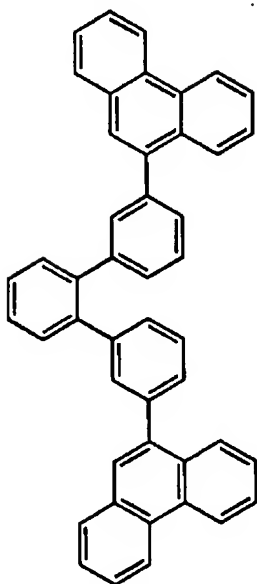
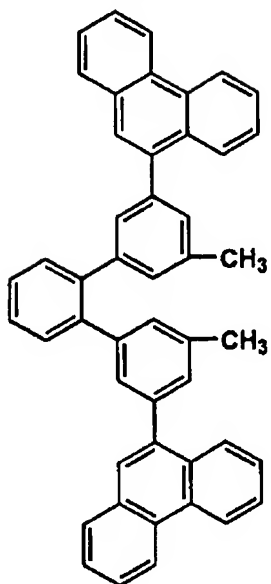
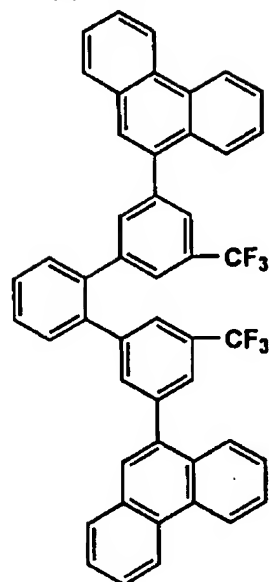
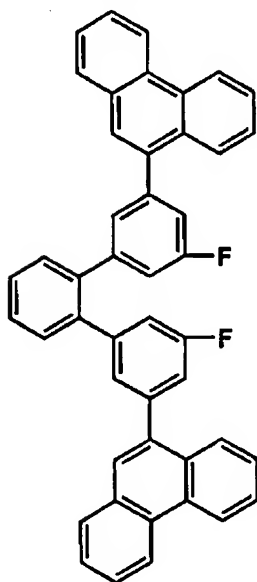
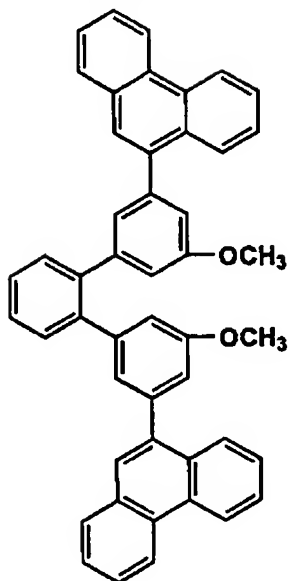
[0163]

[Chemical formula 190]

**B1-(I)-71****B1-(I)-72****B1-(I)-73****B1-(I)-74**

[0164]

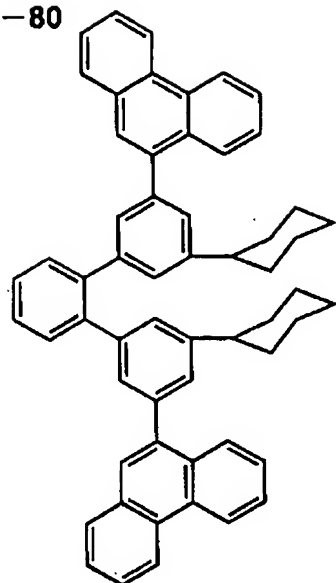
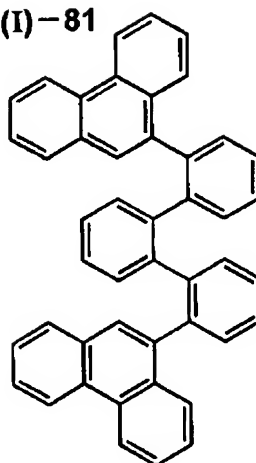
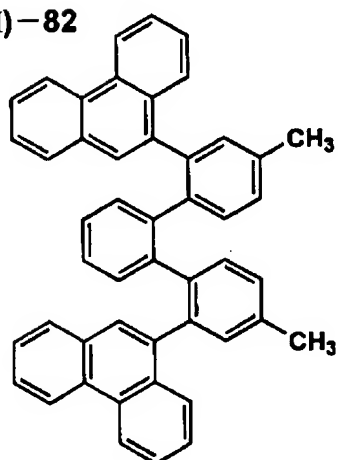
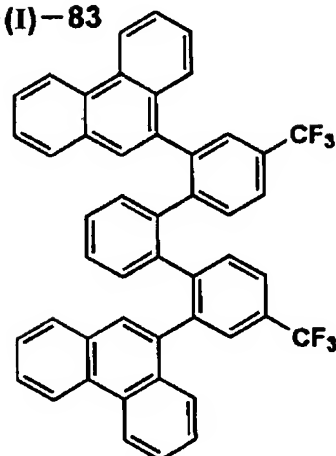
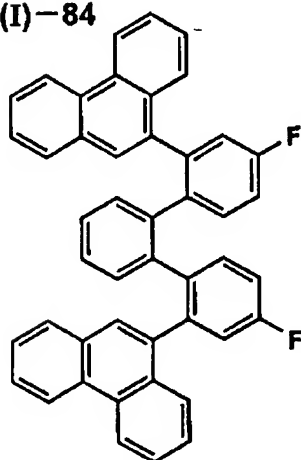
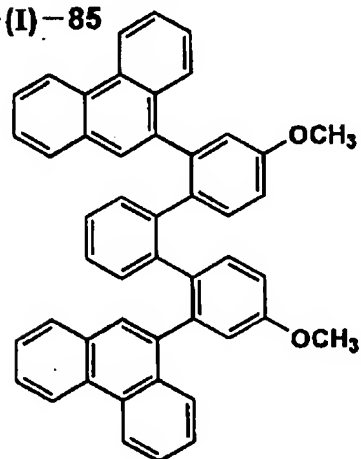
[Chemical formula 191]

**B1-(I)-75****B1-(I)-76****B1-(I)-77****B1-(I)-78****B1-(I)-79**



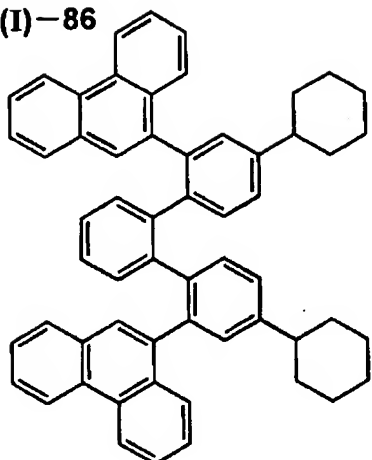
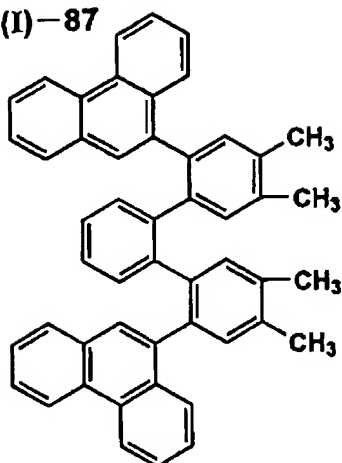
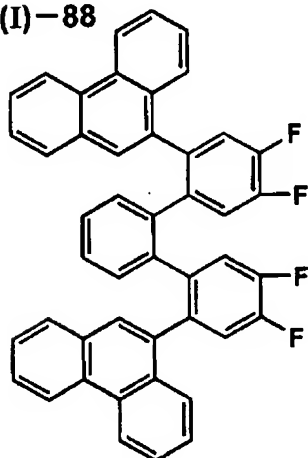
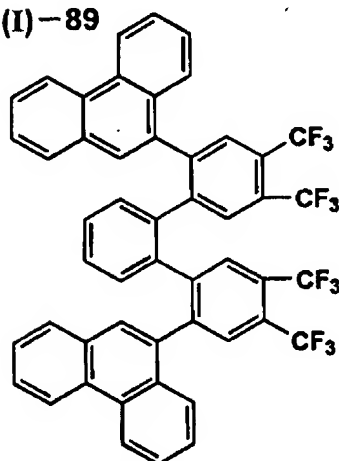
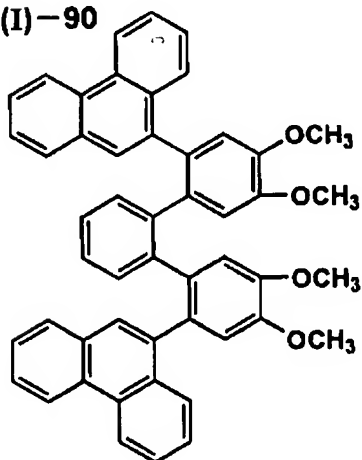
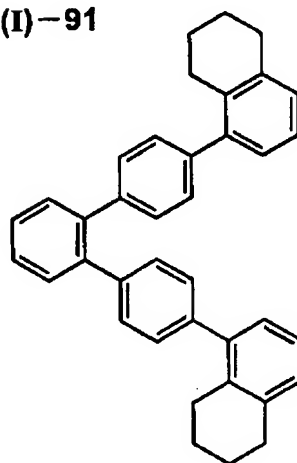
[0165]

[Chemical formula 192]

**B1-(I)-80****B1-(I)-81****B1-(I)-82****B1-(I)-83****B1-(I)-84****B1-(I)-85**

[0166]

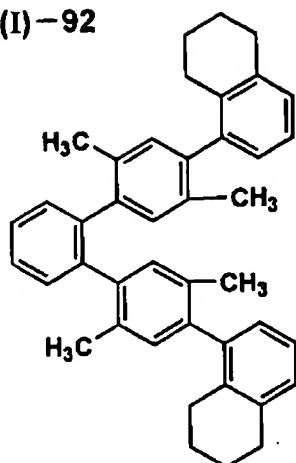
[Chemical formula 193]

**B1-(I)-86****B1-(I)-87****B1-(I)-88****B1-(I)-89****B1-(I)-90****B1-(I)-91**

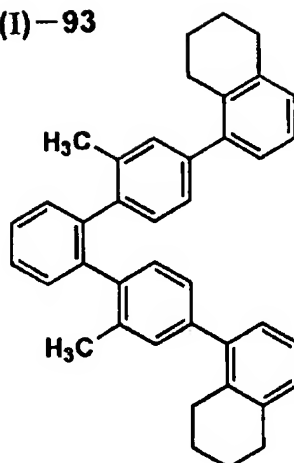
[0167]

[Chemical formula 194]

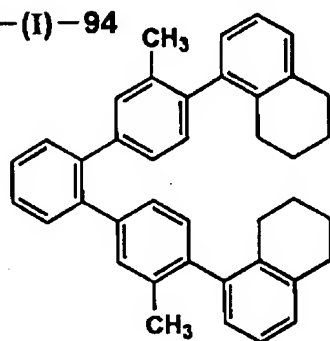
B1-(I)-92



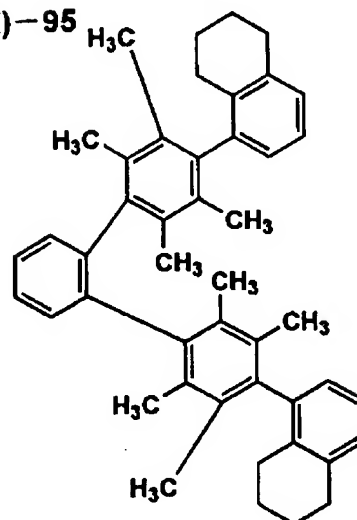
B1-(I)-93



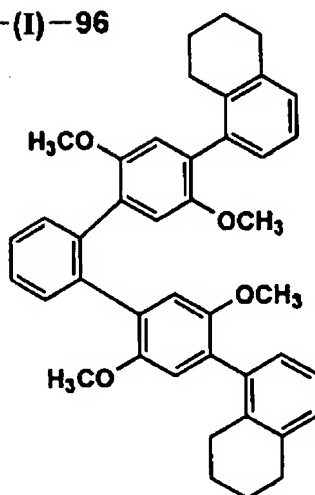
B1-(I)-94



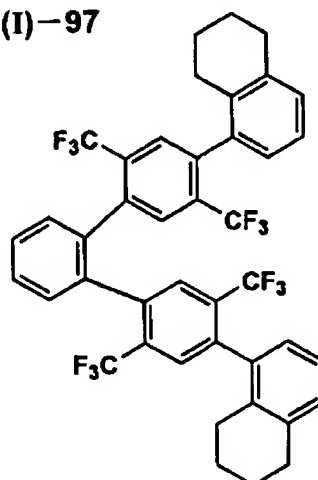
B1-(I)-95



B1-(I)-96

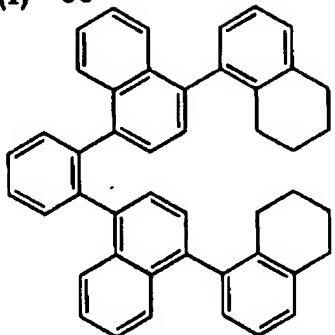
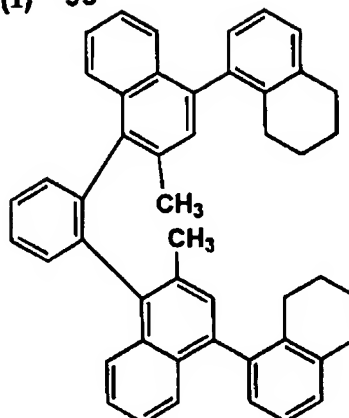
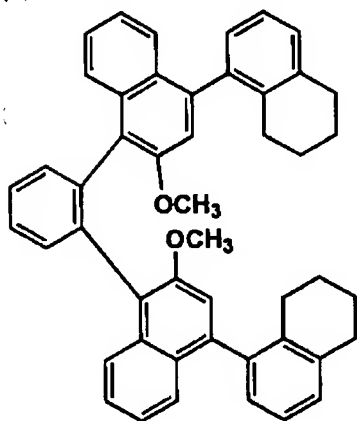
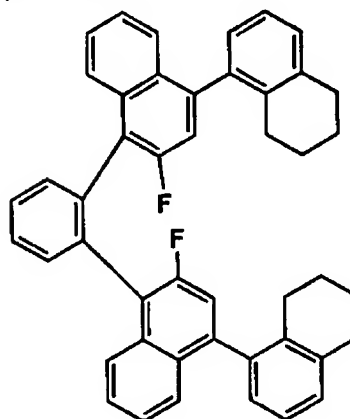
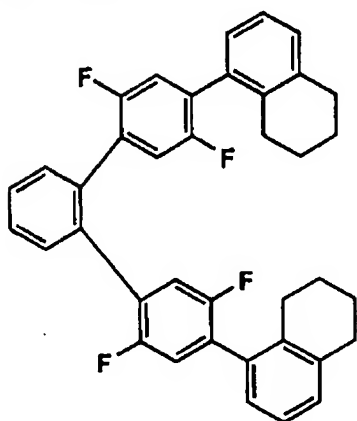
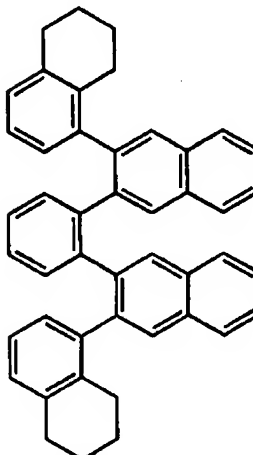


B1-(I)-97



[0168]

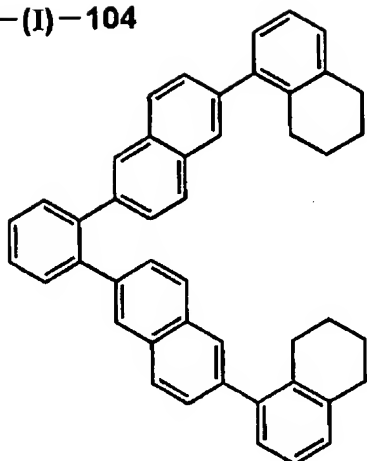
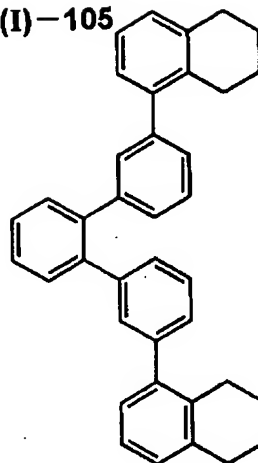
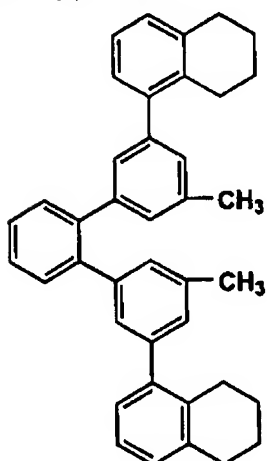
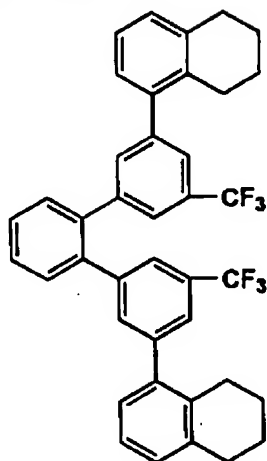
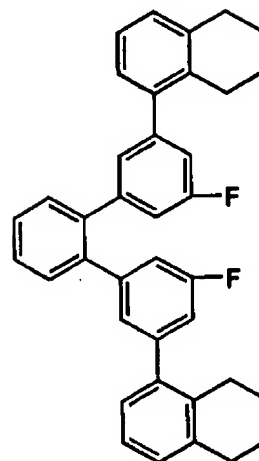
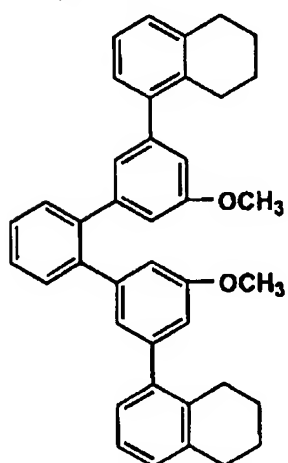
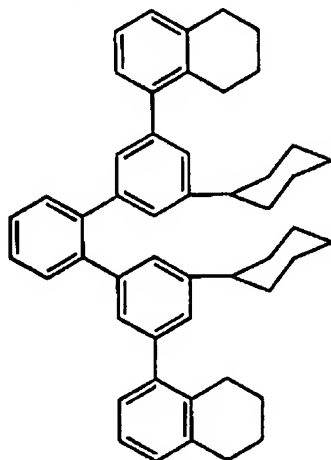
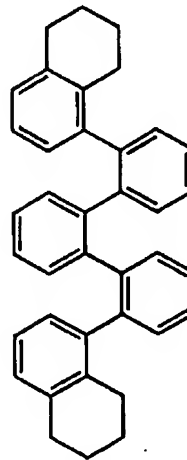
[Chemical formula 195]

**B1-(I)-98****B1-(I)-99****B1-(I)-100****B1-(I)-101****B1-(I)-102****B1-(I)-103**



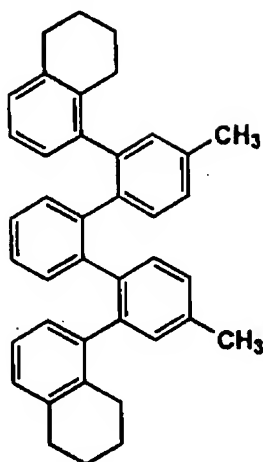
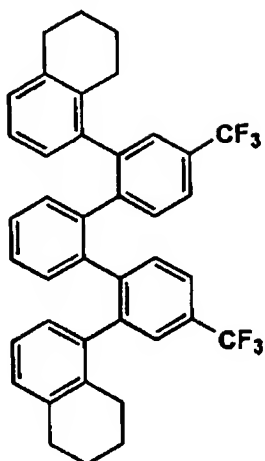
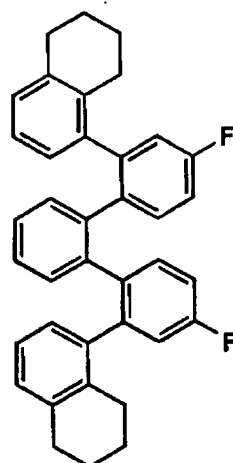
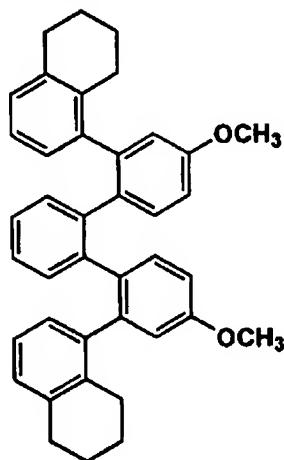
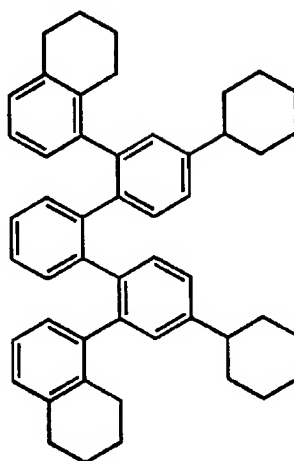
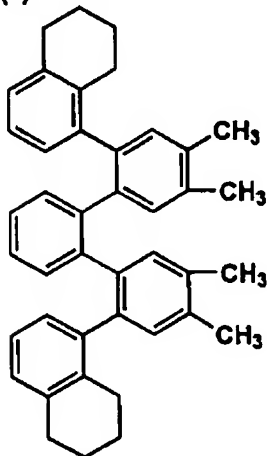
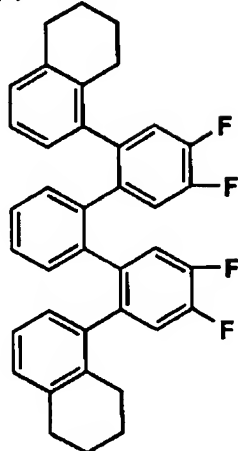
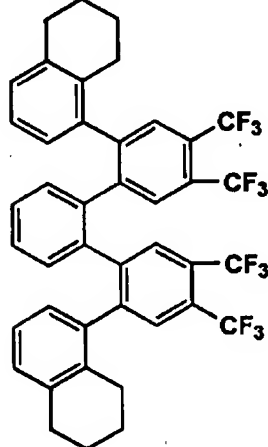
[0169]

[Chemical formula 196]

**B1-(I)-104****B1-(I)-105****B1-(I)-106****B1-(I)-107****B1-(I)-108****B1-(I)-109****B1-(I)-110****B1-(I)-111**

[0170]

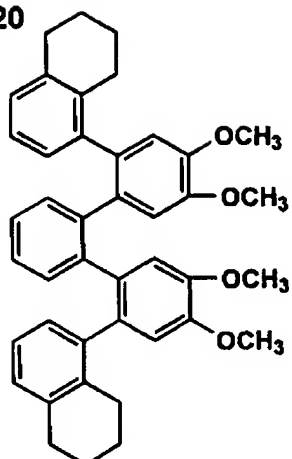
[Chemical formula 197]

**B1-(I)-112****B1-(I)-113****B1-(I)-114****B1-(I)-115****B1-(I)-116****B1-(I)-117****B1-(I)-118****B1-(I)-119**

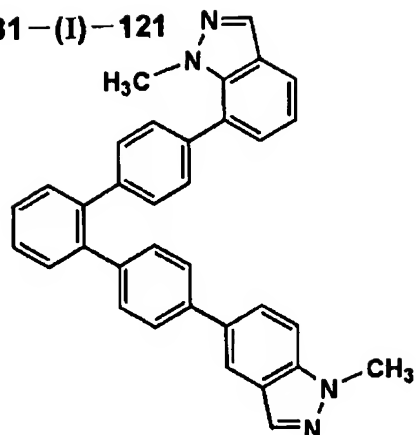
[0171]

[Chemical formula 198]

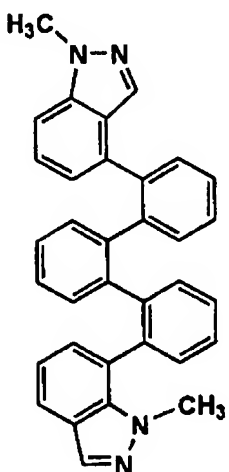
B1-(I)-120



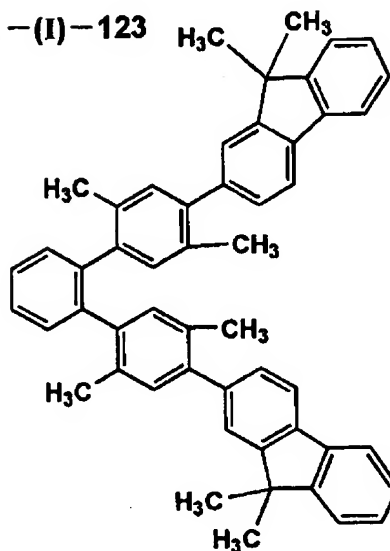
B1-(I)-121



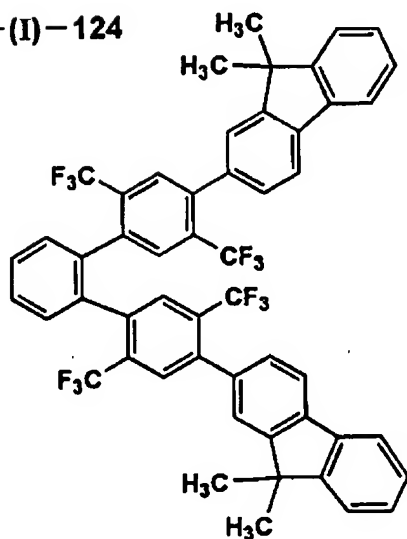
B1-(I)-122



B1-(I)-123

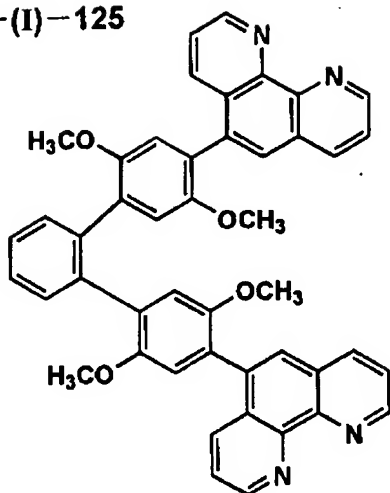
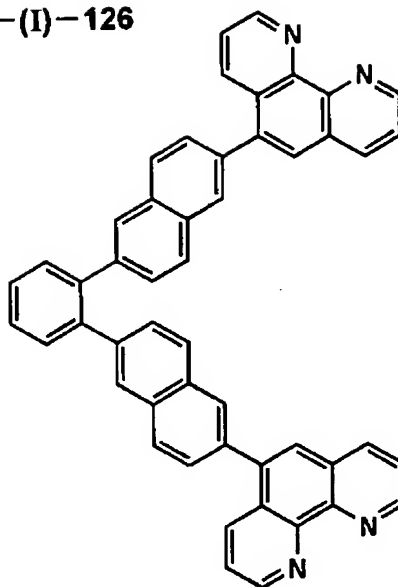
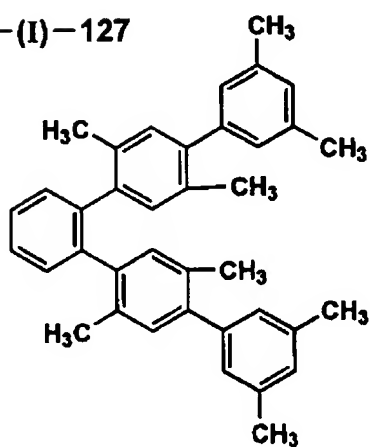
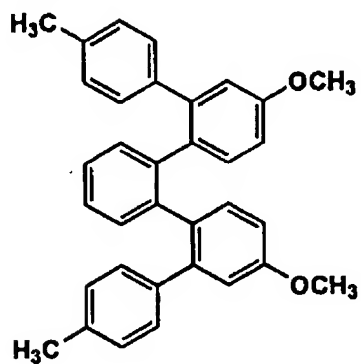
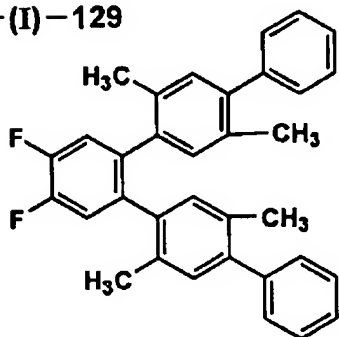


B1-(I)-124



[0172]

[Chemical formula 199]

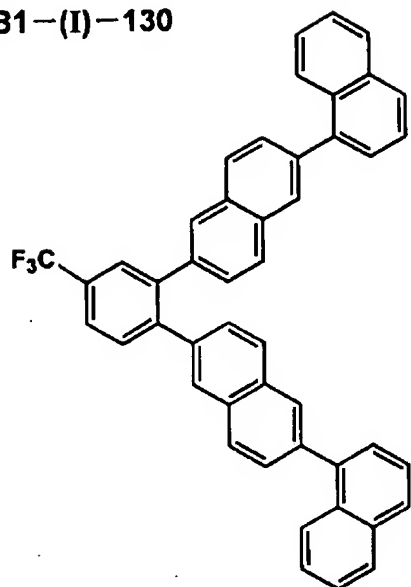
**B1-(I)-125****B1-(I)-126****B1-(I)-127****B1-(I)-128****B1-(I)-129**

[0173]

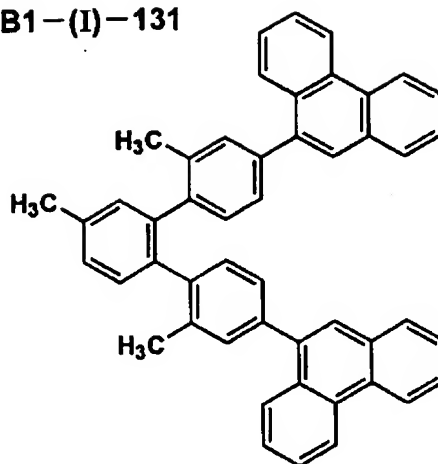


[Chemical formula 200]

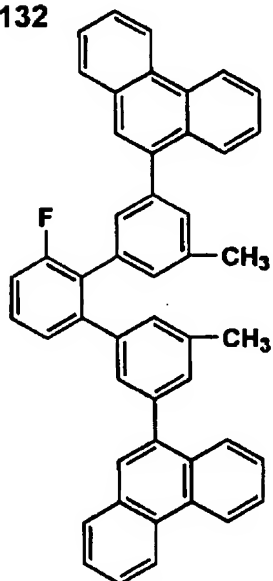
**B1-(I)-130**



**B1-(I)-131**

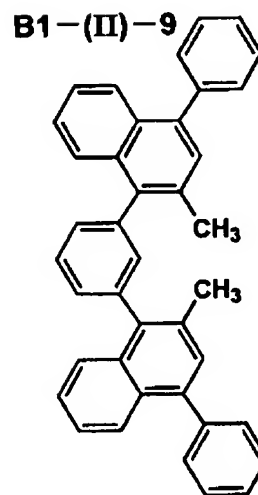
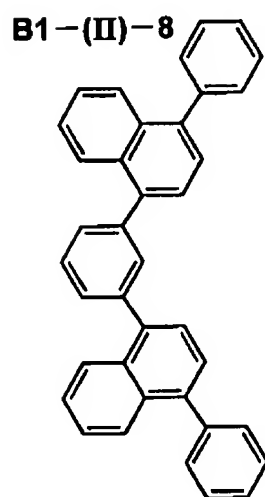
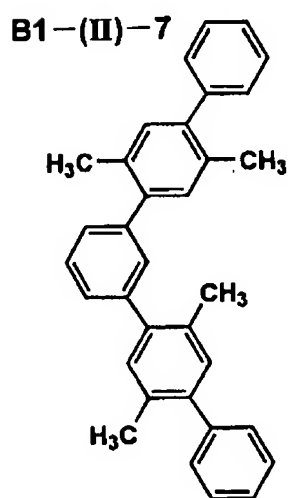
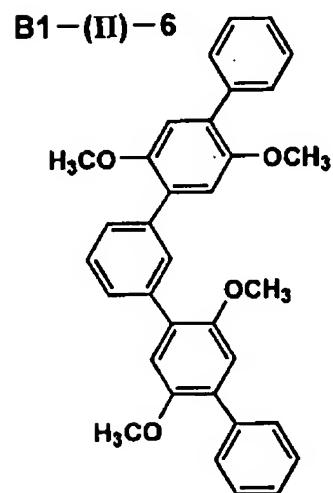
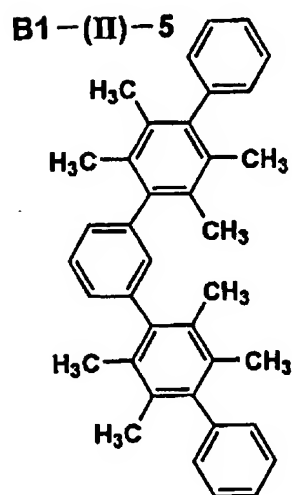
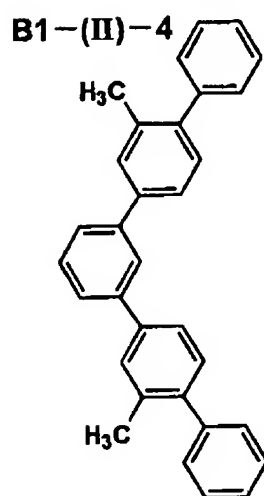
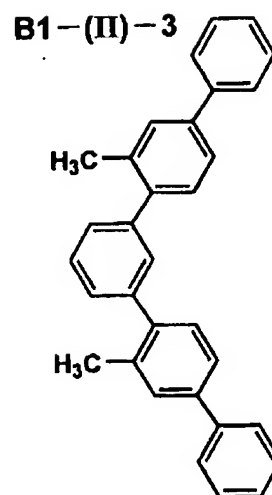
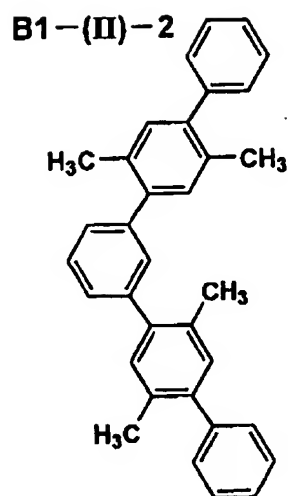
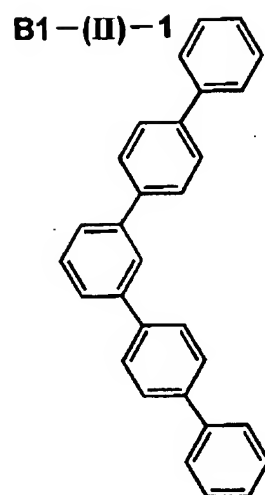


**B1-(I)-132**



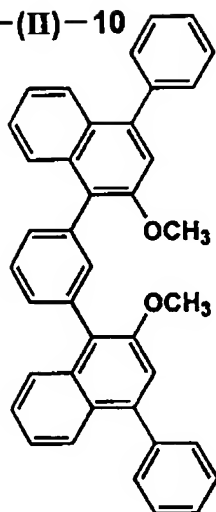
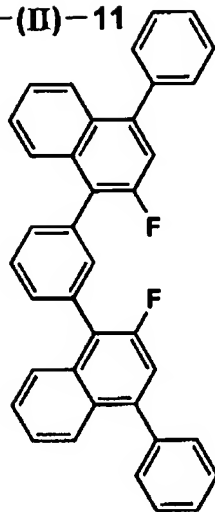
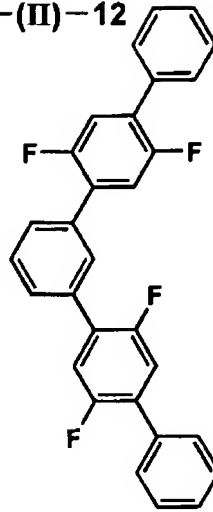
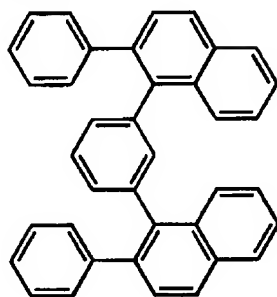
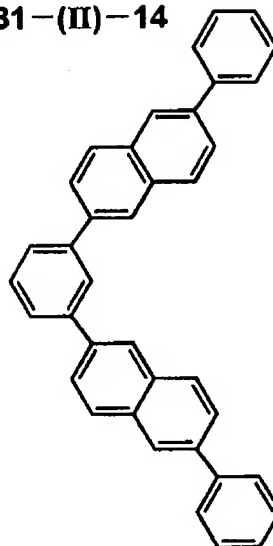
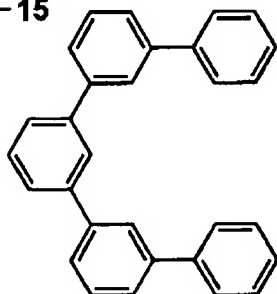
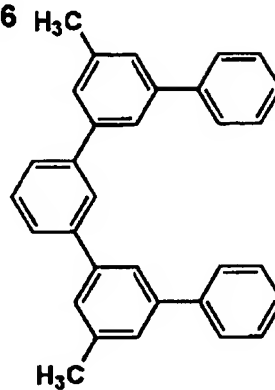
[0174]

[Chemical formula 201]



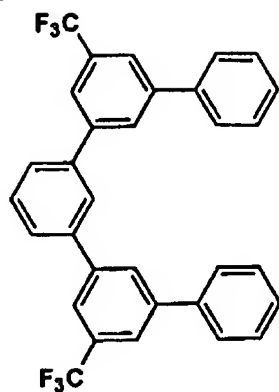
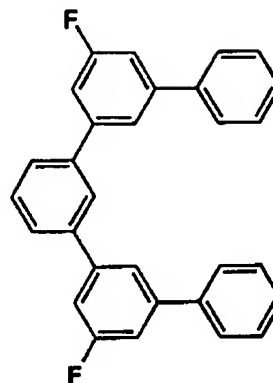
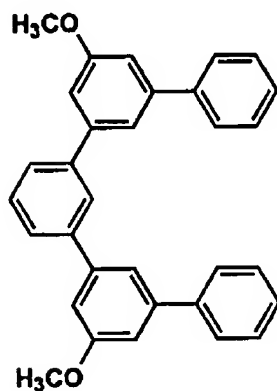
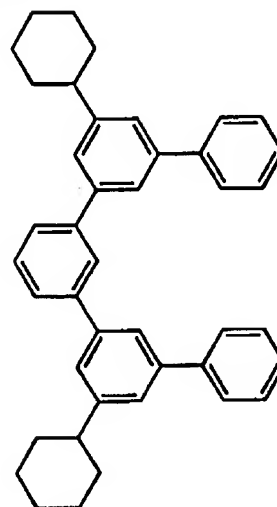
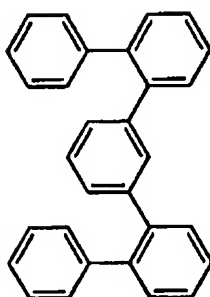
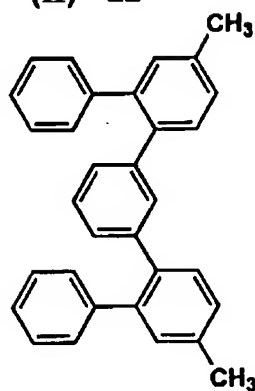
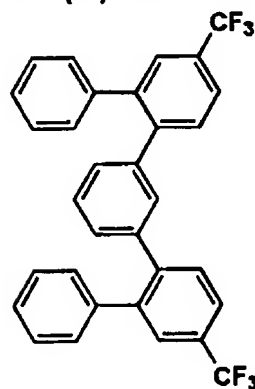
[0175]

[Chemical formula 202]

**B1-(II)-10****B1-(II)-11****B1-(II)-12****B1-(II)-13****B1-(II)-14****B1-(II)-15****B1-(II)-16**

[0176]

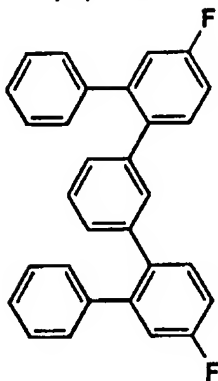
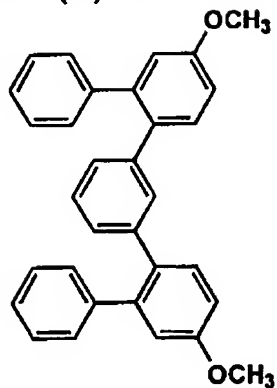
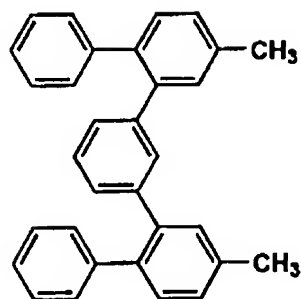
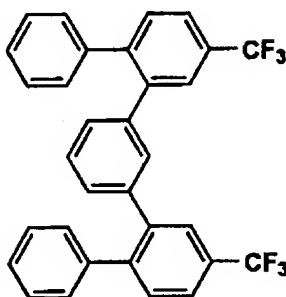
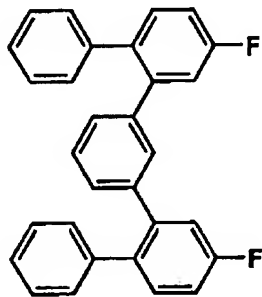
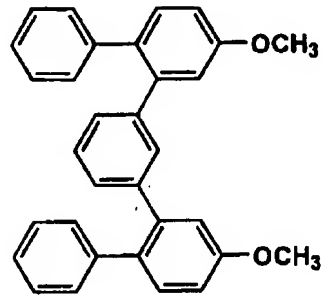
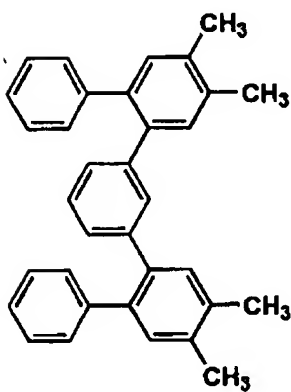
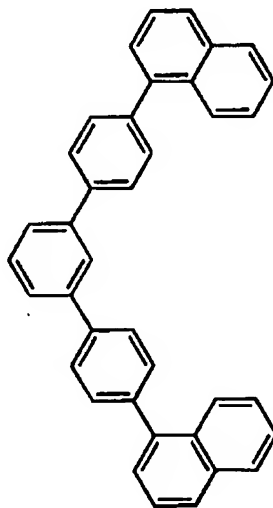
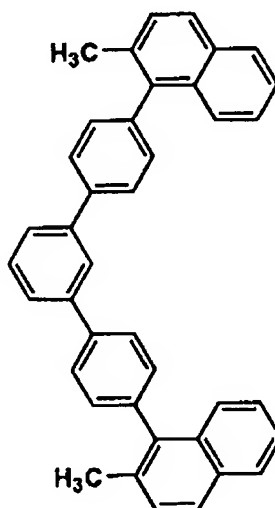
[Chemical formula 203]

**B1-(II)-17****B1-(II)-18****B1-(II)-19****B1-(II)-20****B1-(II)-21****B1-(II)-22****B1-(II)-23**

[0177]

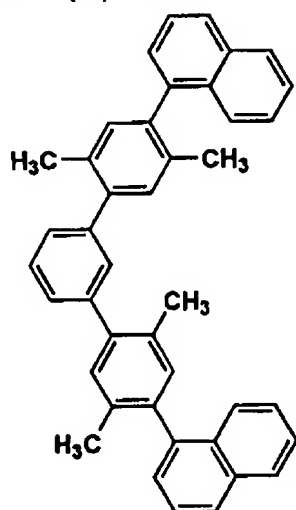
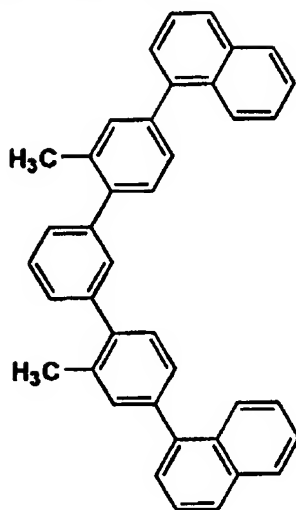
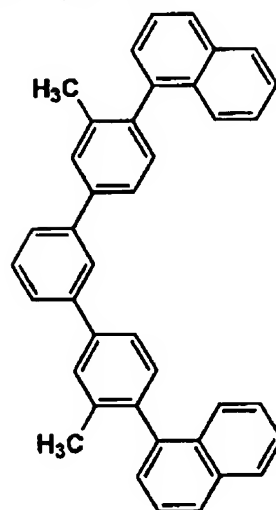
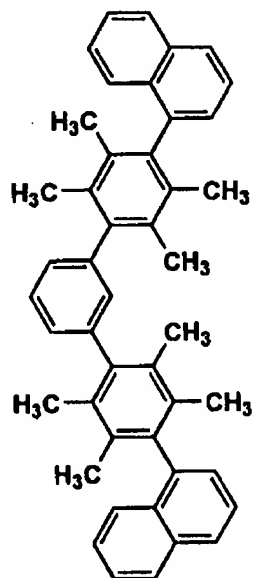
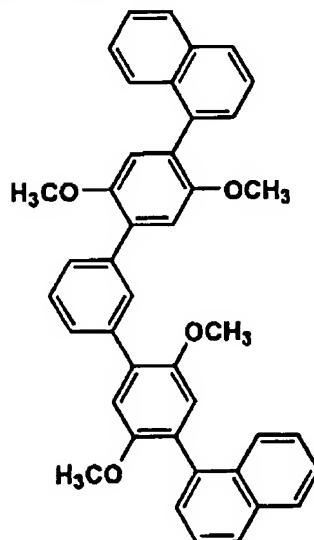
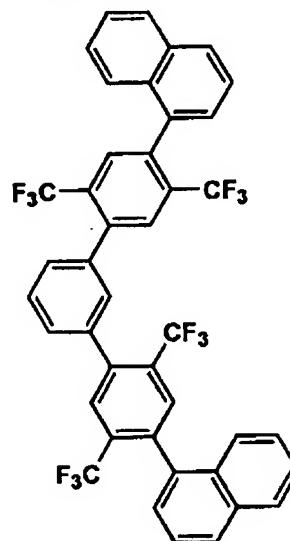
[Chemical formula 204]



**B1-(II)-24****B1-(II)-25****B1-(II)-26****B1-(II)-27****B1-(II)-28****B1-(II)-29****B1-(II)-30****B1-(II)-31****B1-(II)-32**

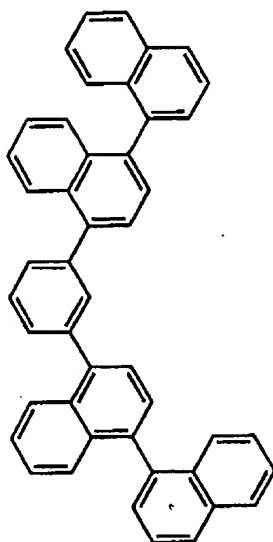
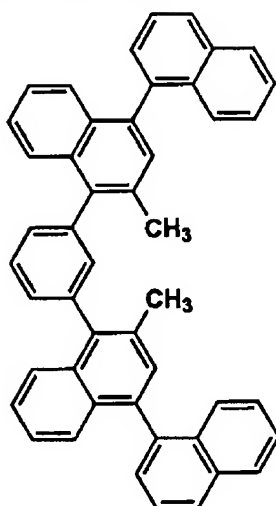
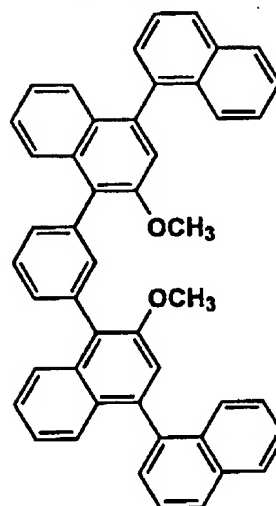
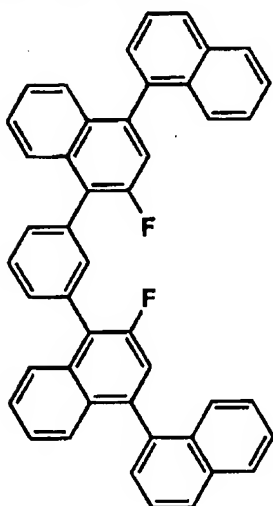
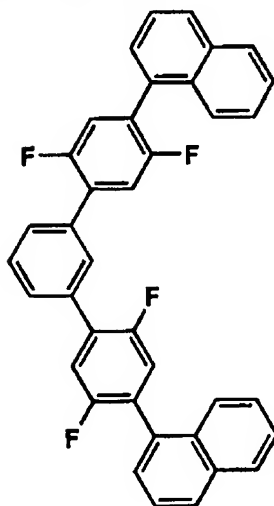
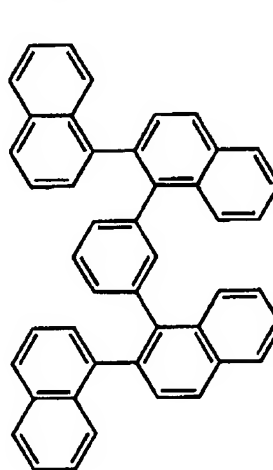
[0178]

[Chemical formula 205]

**B1-(II)-33****B1-(II)-34****B1-(II)-35****B1-(II)-36****B1-(II)-37****B1-(II)-38**

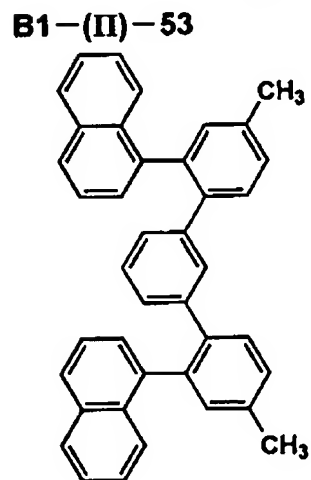
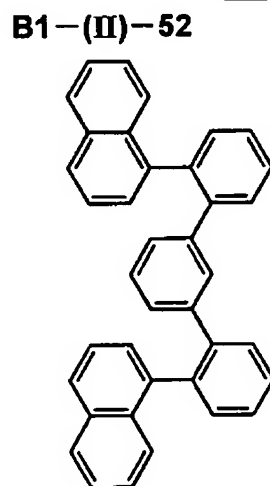
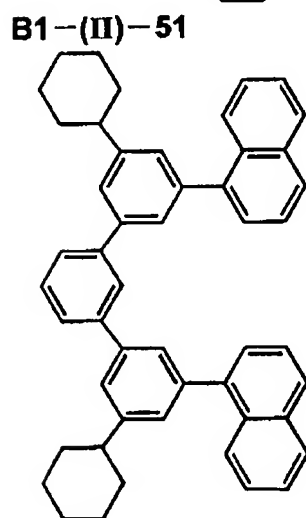
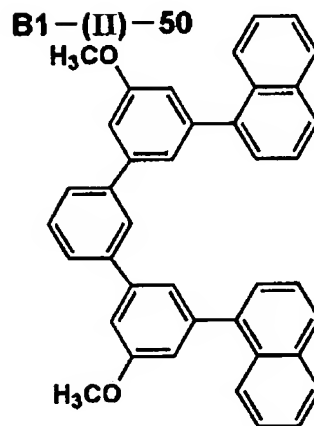
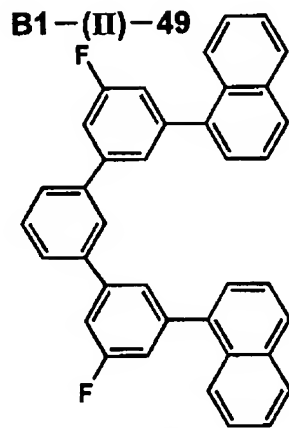
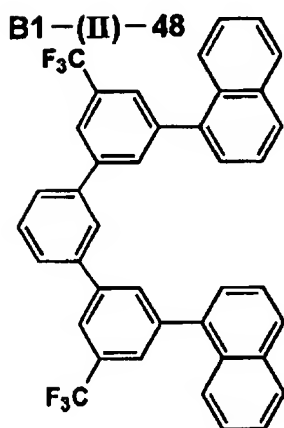
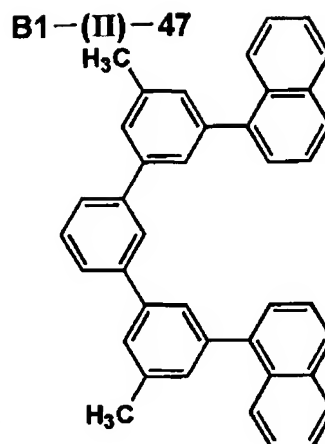
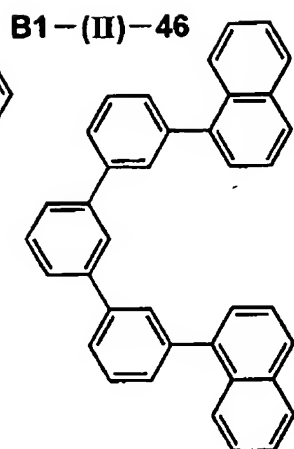
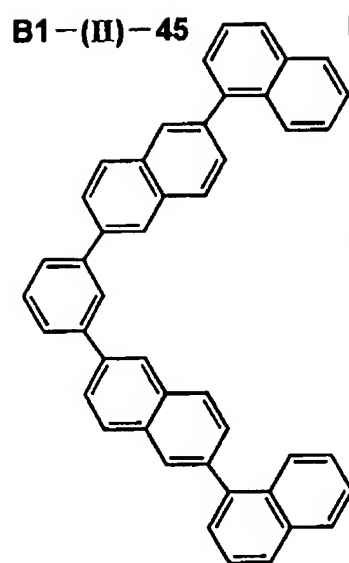
[0179]

[Chemical formula 206]

**B1-(II)-39****B1-(II)-40****B1-(II)-41****B1-(II)-42****B1-(II)-43****B1-(II)-44**

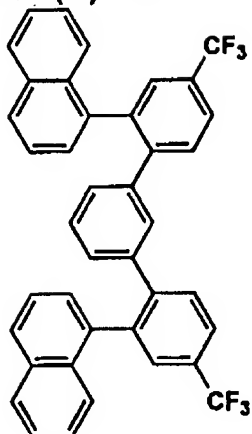
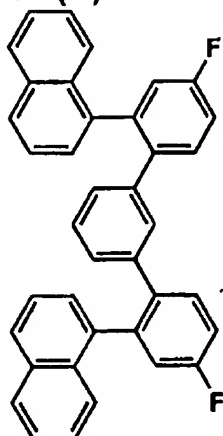
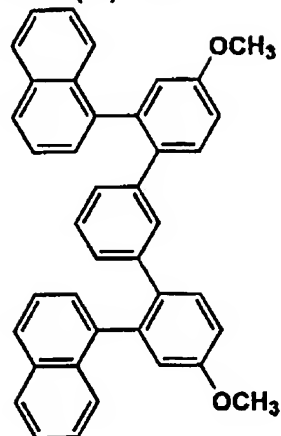
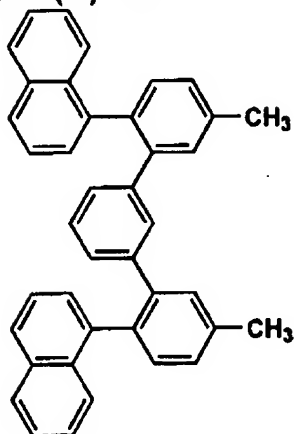
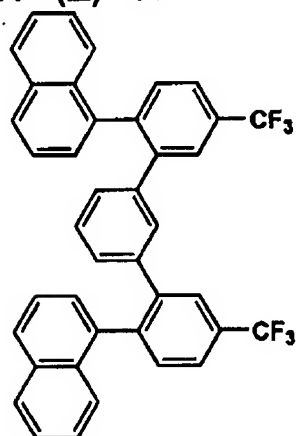
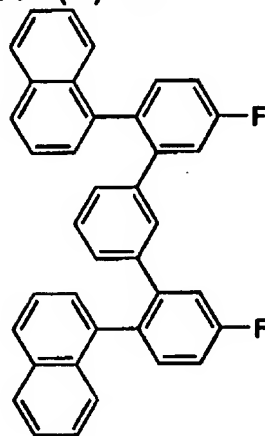
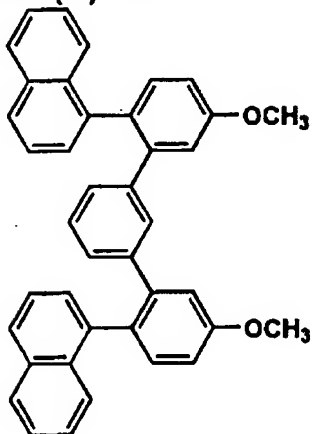
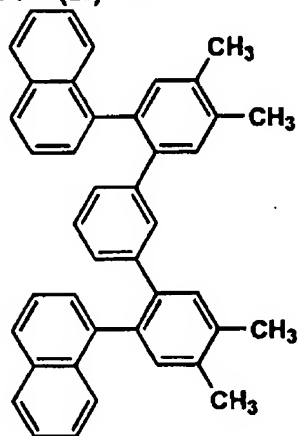
[0180]

[Chemical formula 207]



[0181]

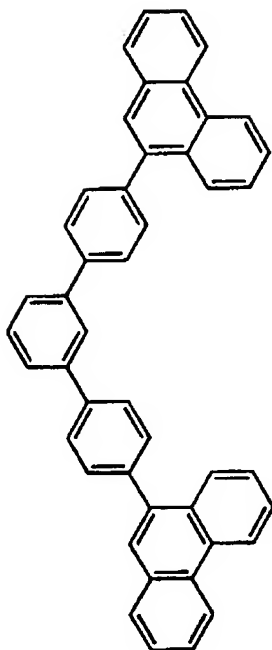
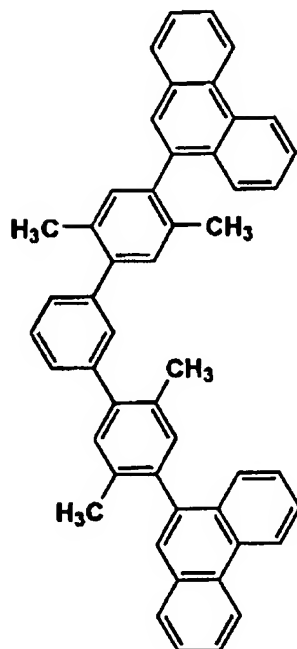
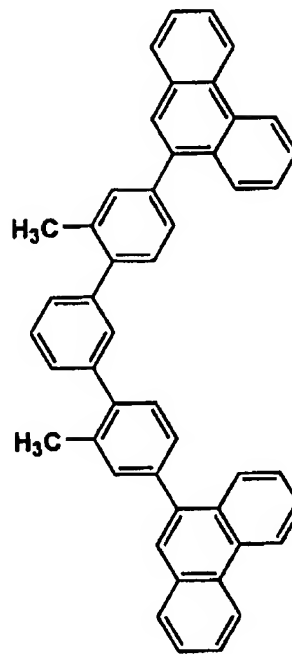
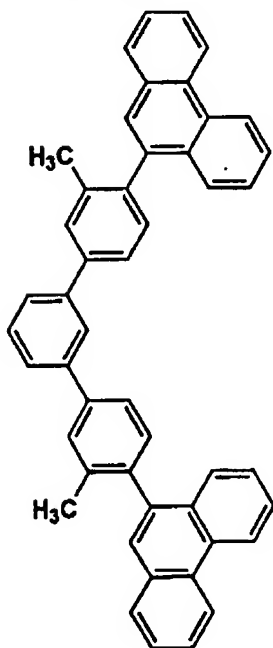
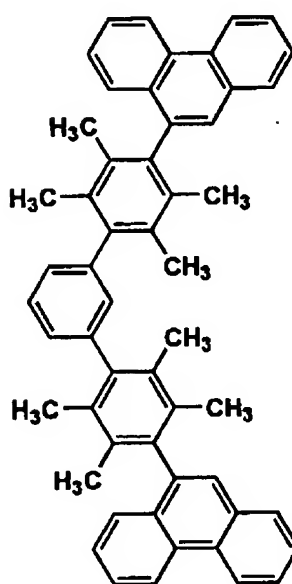
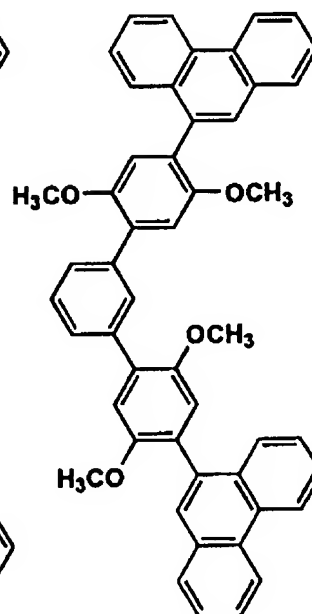
[Chemical formula 208]

**B1-(II)-54****B1-(II)-55****B1-(II)-56****B1-(II)-57****B1-(II)-58****B1-(II)-59****B1-(II)-60****B1-(II)-61**

[0182]

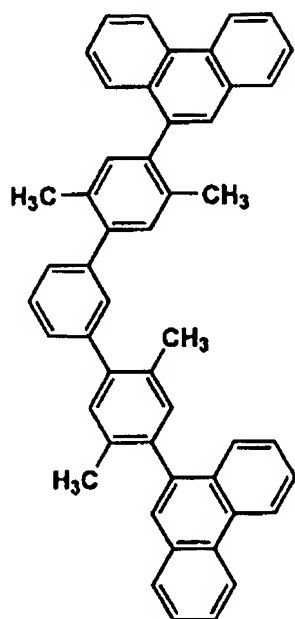
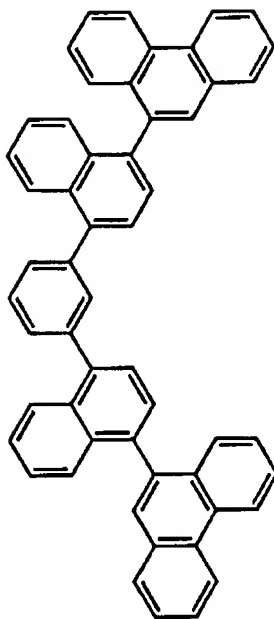
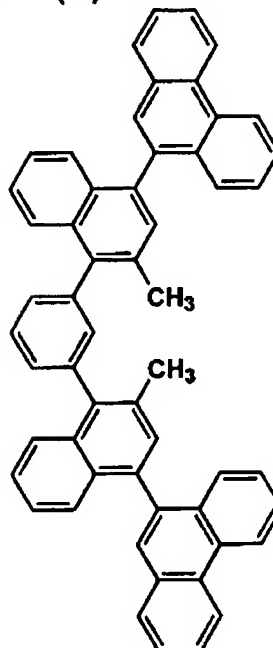
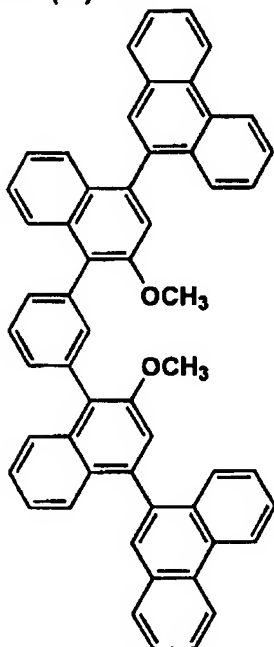
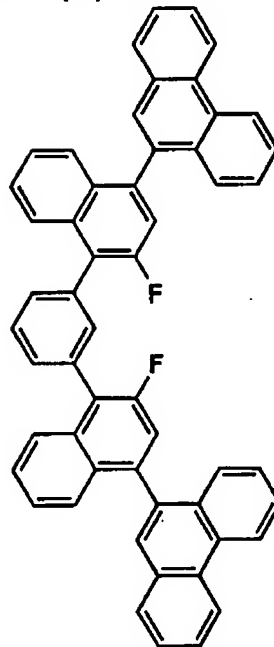
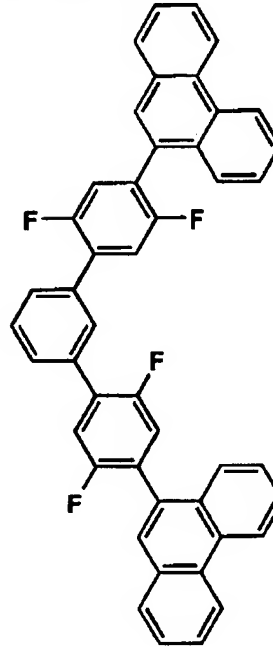
[Chemical formula 209]



**B1-(II)-62****B1-(II)-63****B1-(II)-64****B1-(II)-65****B1-(II)-66****B1-(II)-67**

[0183]

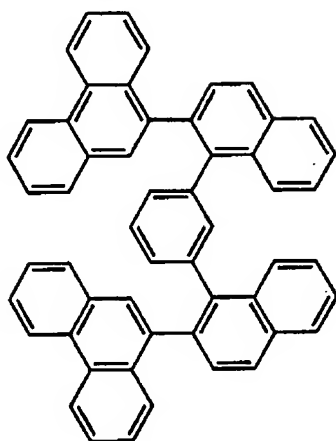
[Chemical formula 210]

**B1-(II)-68****B1-(II)-69****B1-(II)-70****B1-(II)-71****B1-(II)-72****B1-(II)-73**

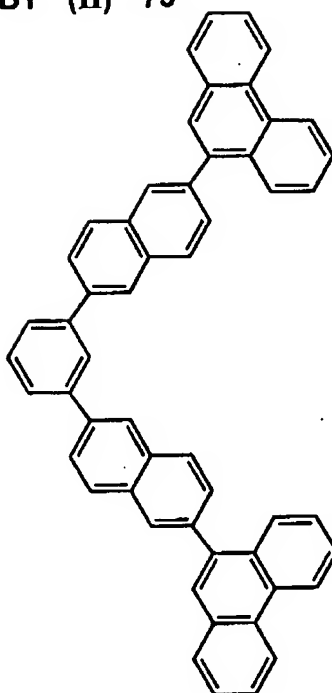
[0184]

[Chemical formula 211]

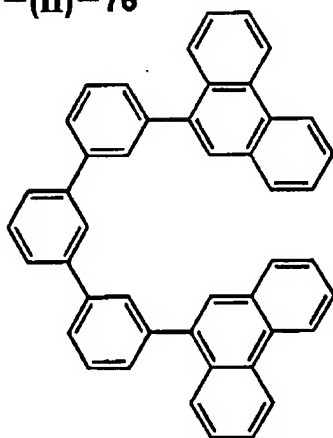
**B1-(II)-74**



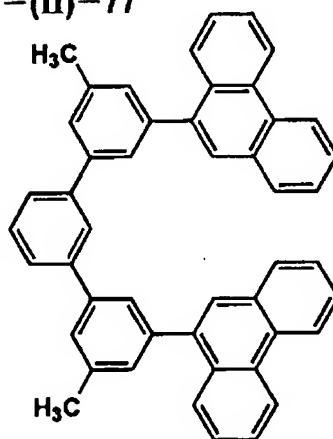
**B1-(II)-75**



**B1-(II)-76**

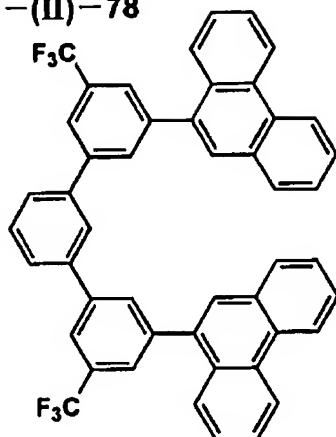
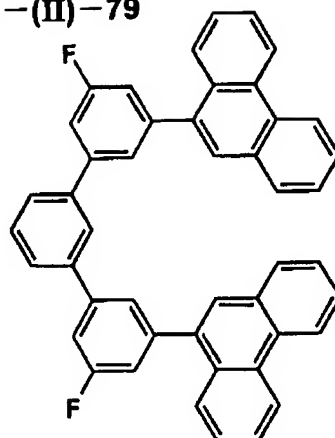
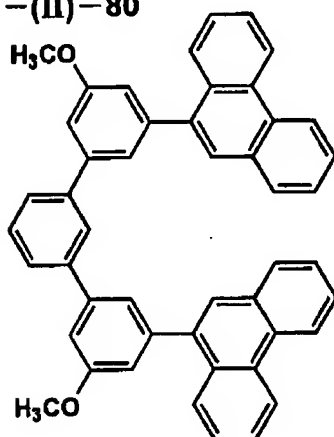
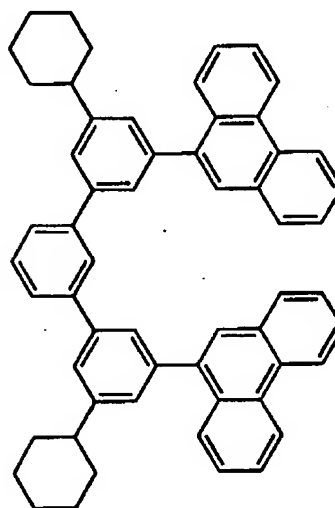
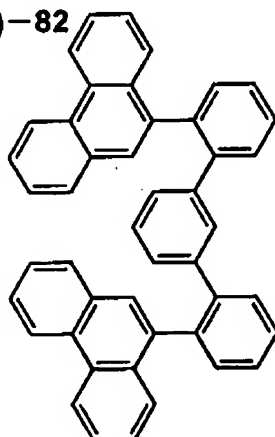
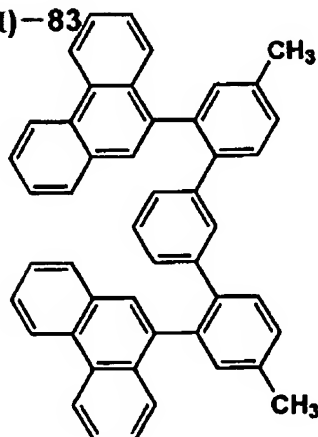


**B1-(II)-77**



[0185]

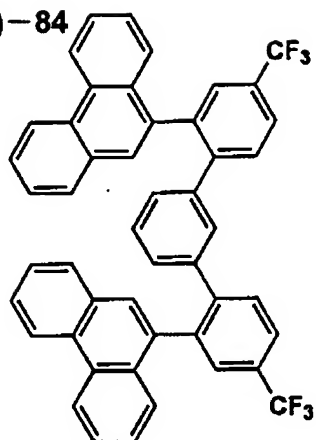
[Chemical formula 212]

**B1-(II)-78****B1-(II)-79****B1-(II)-80****B1-(II)-81****B1-(II)-82****B1-(II)-83**

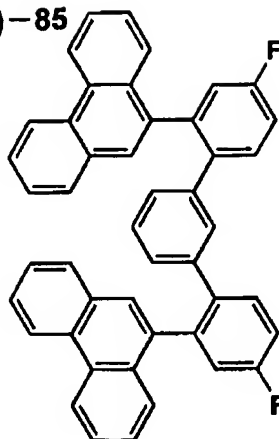
[0186]

[Chemical formula 213]

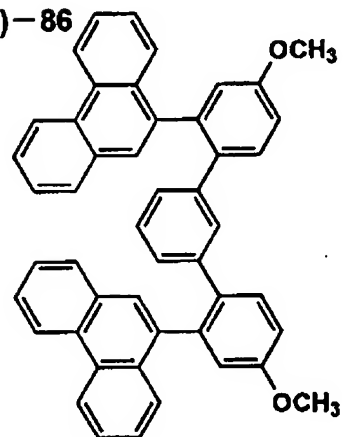
B1-(II)-84



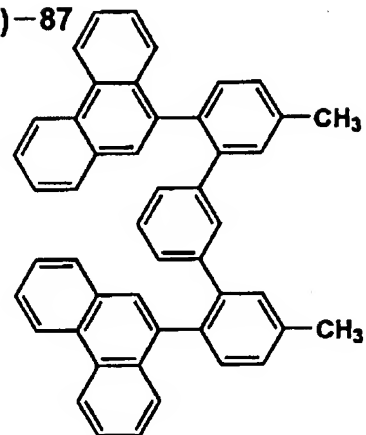
B1-(II)-85



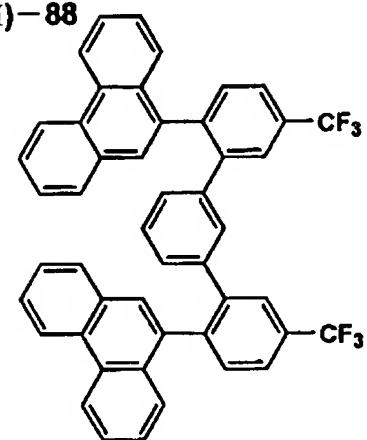
B1-(II)-86



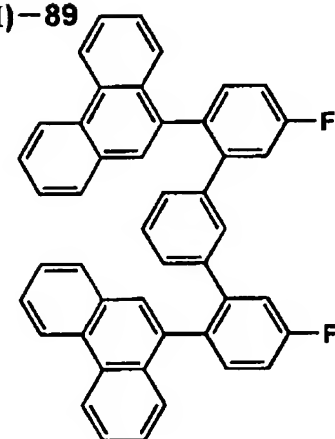
B1-(II)-87



B1-(II)-88



B1-(II)-89

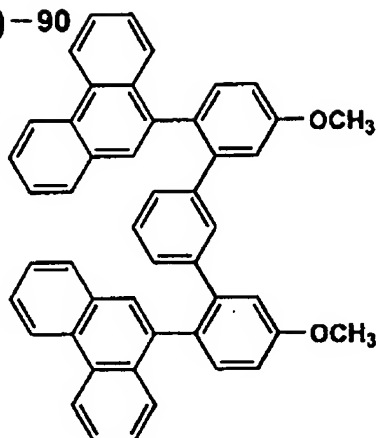




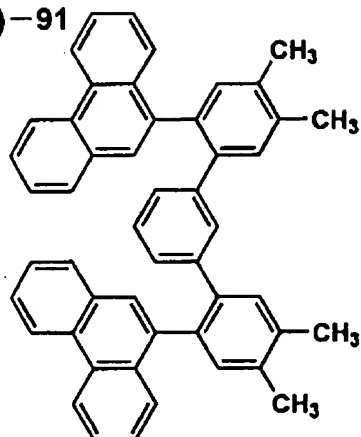
[0187]

[Chemical formula 214]

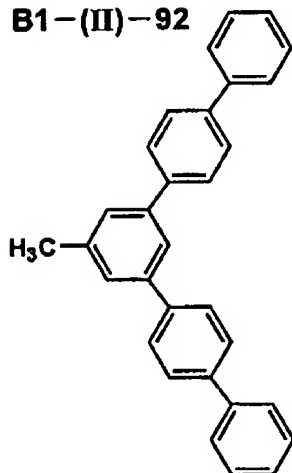
B1-(II)-90



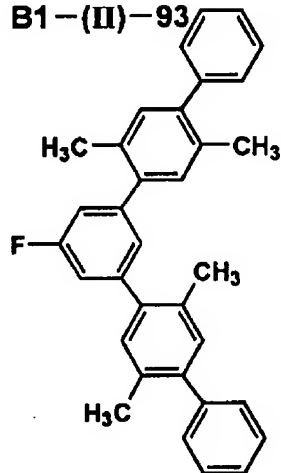
B1-(II)-91



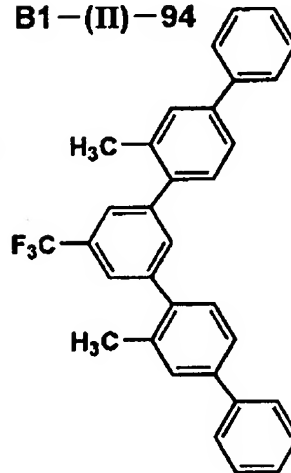
B1-(II)-92



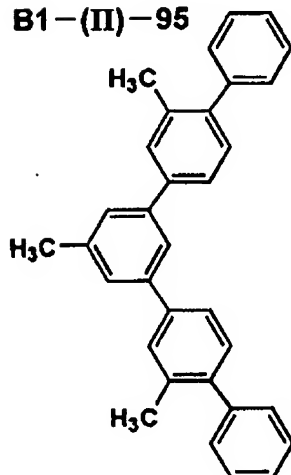
B1-(II)-93



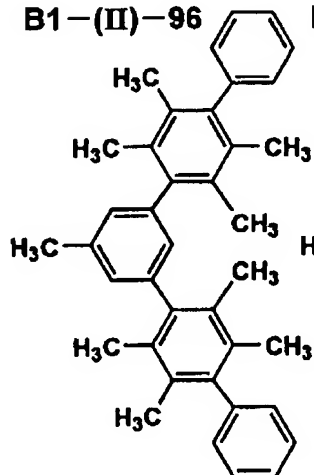
B1-(II)-94



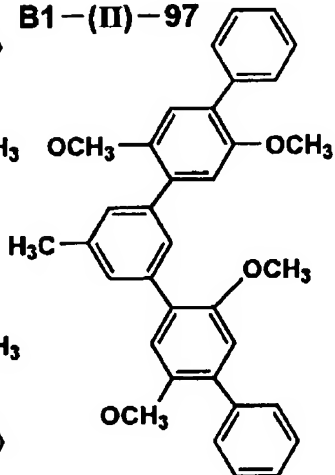
B1-(II)-95



B1-(II)-96

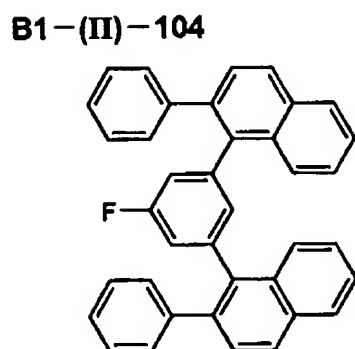
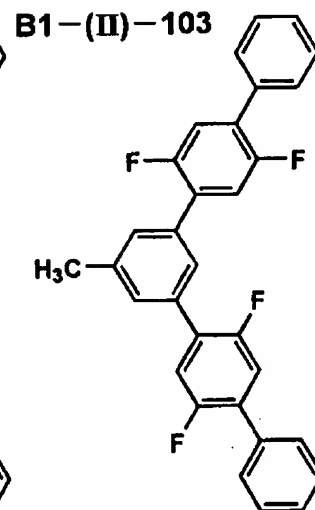
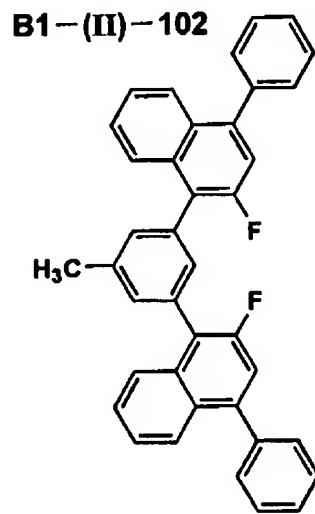
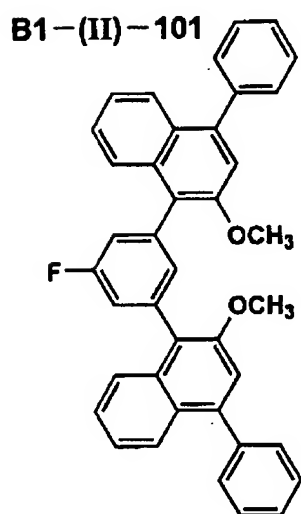
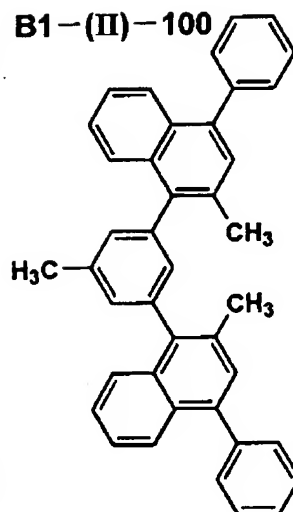
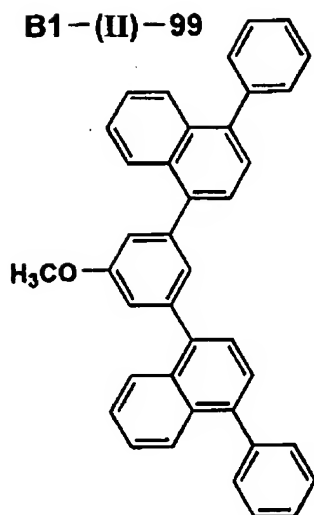
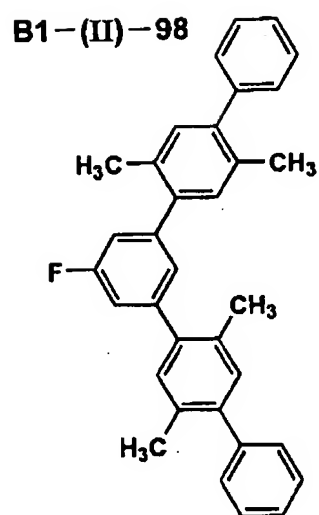


B1-(II)-97



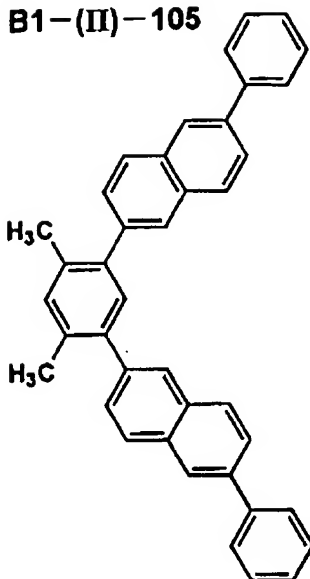
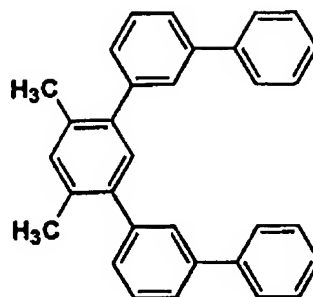
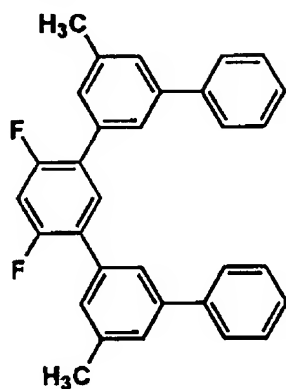
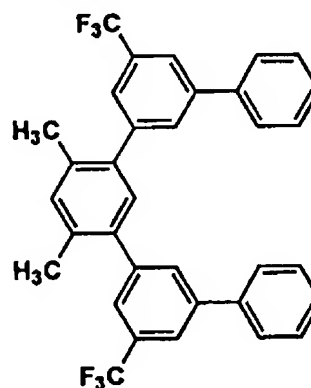
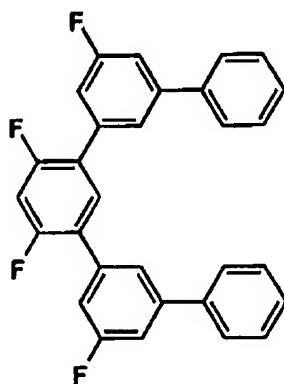
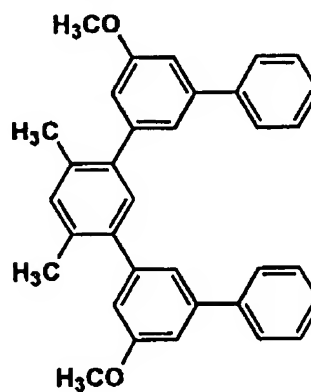
[0188]

[Chemical formula 215]



[0189]

[Chemical formula 216]

**B1-(II)-105****B1-(II)-106****B1-(II)-107****B1-(II)-108****B1-(II)-109****B1-(II)-110**

[0190]Next, the compound denoted by a general formula (B-2-1) is explained.

[0191]In said general formula (B-2-1), although there is no restriction in particular as an n-valent connection machine denoted by Z, it is a connection machine preferably denoted by  $Z_1$  of a general formula (B-2-2) - a general formula (B-2-7) -  $Z_6$ .

[0192]Although  $R_1 - R_8$  express a hydrogen atom or a substituent respectively, [ in said general formula (B-2-1) ] as a substituent -- an alkyl group (for example, a methyl group and an ethyl group.) i-propyl group, a hydroxyethyl machine, a methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, a cyclohexyl group, a benzyl group, etc., An alkenyl group (for example, a vinyl group, a propenyl machine, a styryl machine, etc.), alkynyl groups (for example, ethynyl group etc.) and an aryl group (for example, a phenyl group.) Alkoxy machines, such as a naphthyl group, p-trill machine, and p-chlorophenyl machine. (For example, a methoxy group, an ethoxy basis, i-propoxy group, a butoxy machine, etc.), Aryloxy groups (for example, phenoxy group etc.), an alkylthio group. (For example, a methylthio group, an ethyl thio group, i-propyl thio group, etc.), Arylthio groups (for example, phenylthio group etc.), a halogen atom. (For example, a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc.), and amino groups. (for example, a dimethylamino group, a methylamino machine, a diphenylamino machine, etc.), cyano groups, a nitro group, and a heterocyclic machine (for example, a pyrrole group, a pyrrolidyl machine, a pyrazolyl machine, an imidazolyl group, a pyridyl group, and a benzimidazolyl machine.) a benzothiazolyl machine, a benzoxazolyl machine, etc. -- etc. -- it is mentioned. As an aromatic series machine, the above-mentioned aryl group and heteroaryl groups (for example, a pyrrole group, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, benzoxazolyl, etc.) are mentioned. Adjoining substituents may be condensed mutually and they may form a ring.

[0193]In said general formula (B-2-2) - (B-2-7), although  $R_a - R_f$  express a hydrogen atom or a substituent respectively, the example is synonymous with said  $R_1 - R_8$ .

[0194]In said general formula (B-2-1) - (B-2-7), the divalent Ally Wren machine denoted by Ar

is a residue which removed a hydrogen atom or two substituents from the arbitrary positions of arbitrary aromatic compounds.

Even if it comprises hydrocarbon, this ARIREN machine may be the heterocycle containing a hetero atom, or may be condensed.

[0195]In said general formula (B-2-8), the Ally Wren machine of m value denoted by  $Ar_1$  is a residue which removed a hydrogen atom or m substituents from the arbitrary positions of arbitrary aromatic compounds.

Even if it comprises hydrocarbon, this ARIREN machine may be the heterocycle containing a hetero atom, or may be condensed.

[0196]Each compound concerning this invention denoted by general formula (B-2-1) - (B-2-8) is a compound which has strong fluorescence in a solid state.

It excels also in electric field luminescence and can be effectively used as a luminescent material.

Since electronic pouring nature and electron transport property outstanding from the metal electrode are very excellent, when the compound concerning this invention is used as electronic transportation material or a hole blocker, the outstanding luminous efficiency is shown in the element using the above-mentioned compound concerning other luminescent materials or this inventions as a luminescent material.

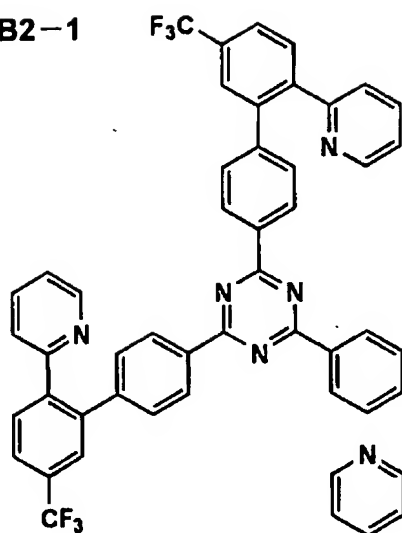
[0197]Although the concrete examples of a compound denoted by general formula (B-2-1) - (B-2-8) are enumerated below hereafter, this invention is not limited to these.

[0198]

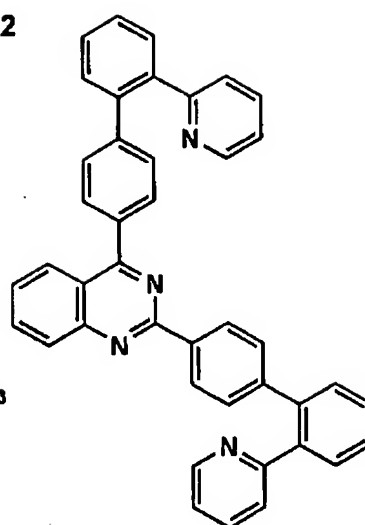


[Chemical formula 217]

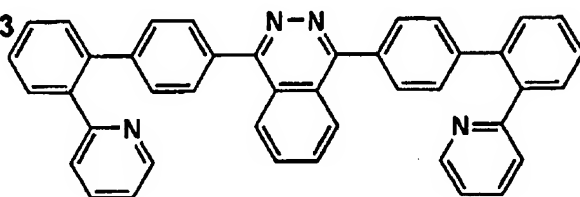
B2-1



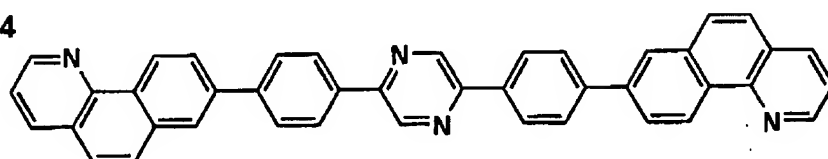
B2-2



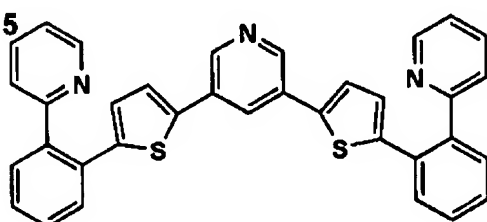
B2-3



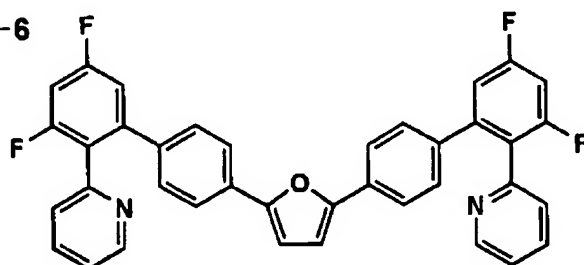
B2-4



B2-5



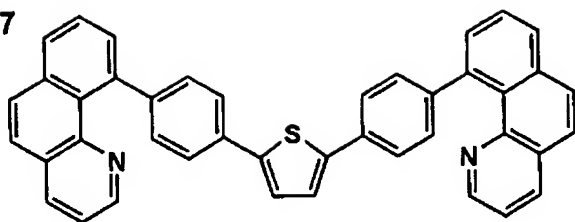
B2-6



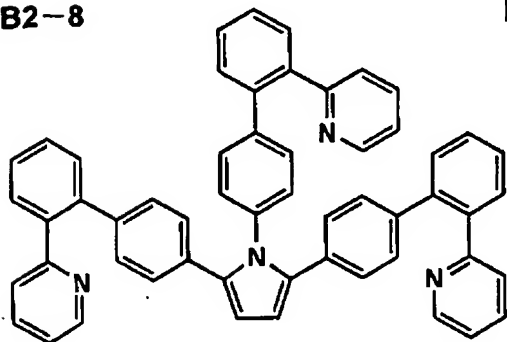
[0199]

[Chemical formula 218]

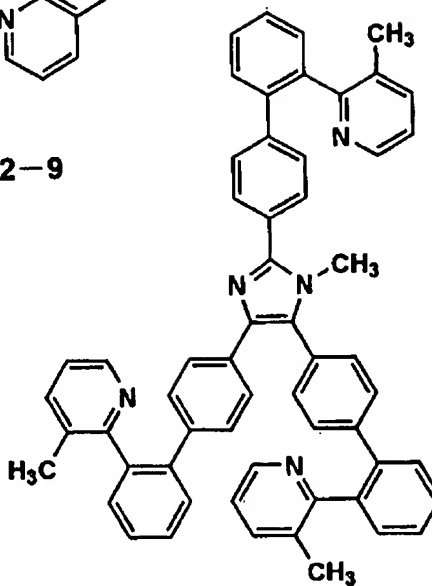
B2-7



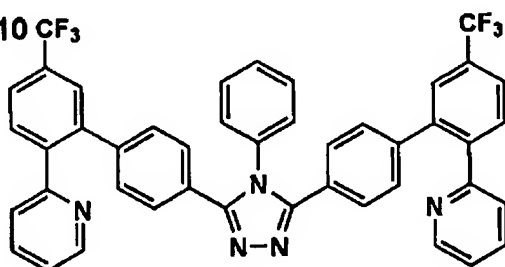
B2-8



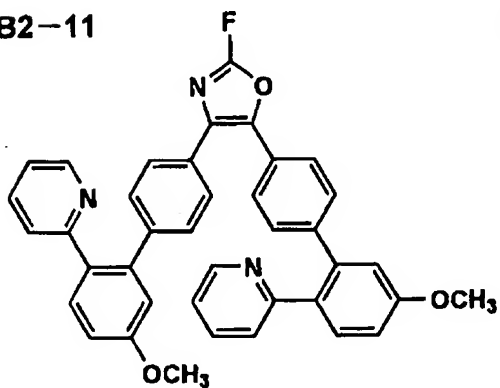
B2-9



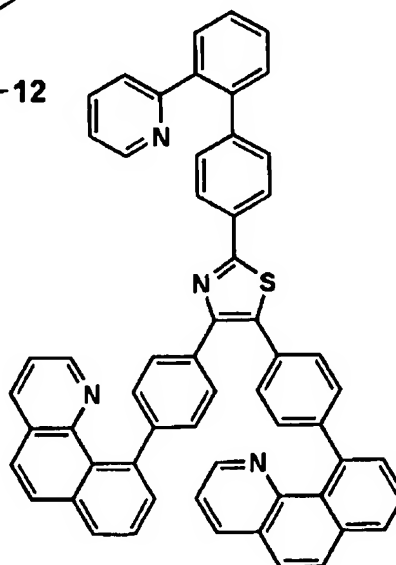
B2-10



B2-11



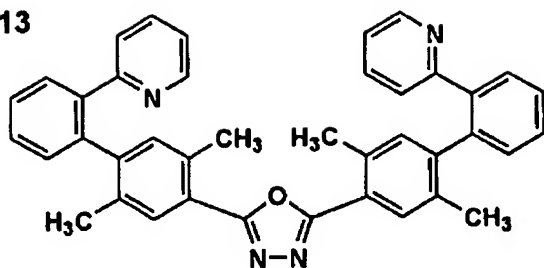
B2-12



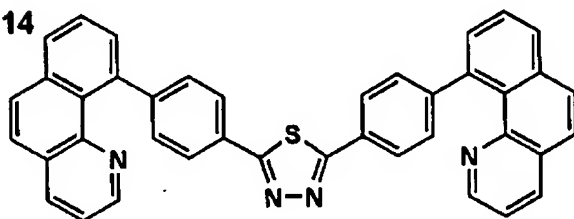
[0200]

[Chemical formula 219]

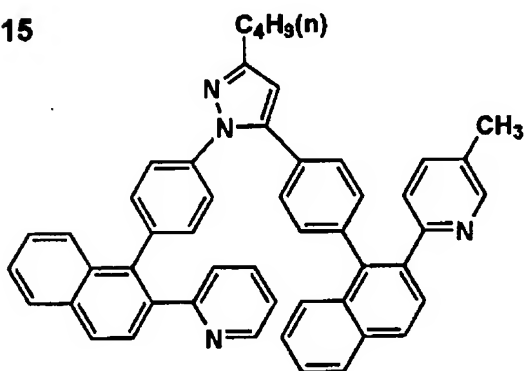
B2-13



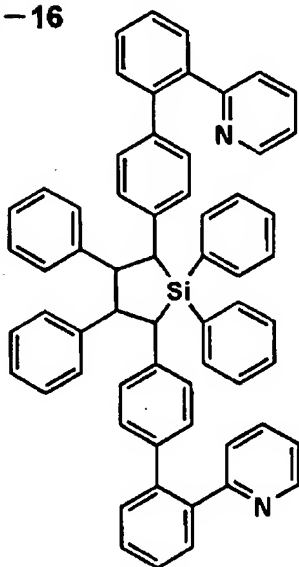
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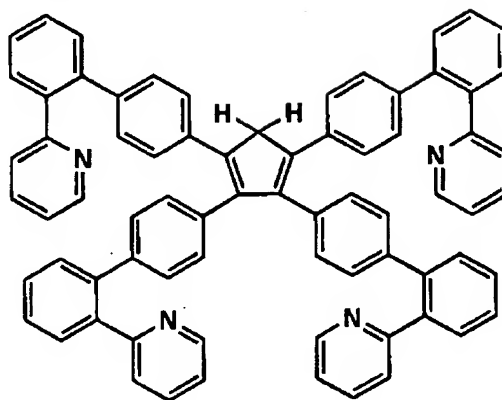
B2-15



B2-16



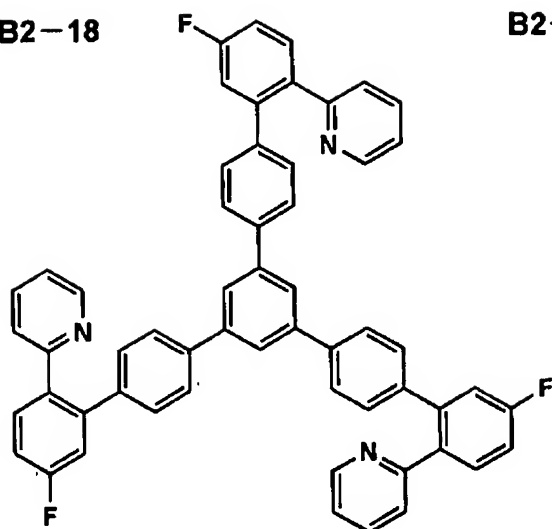
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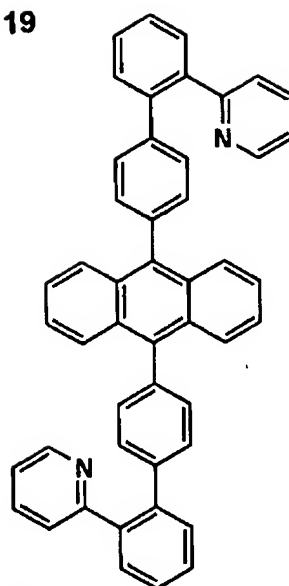
[0201]

[Chemical formula 220]

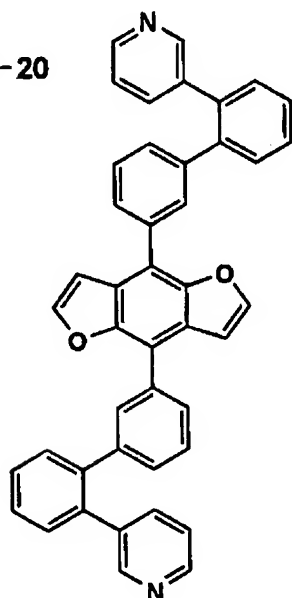
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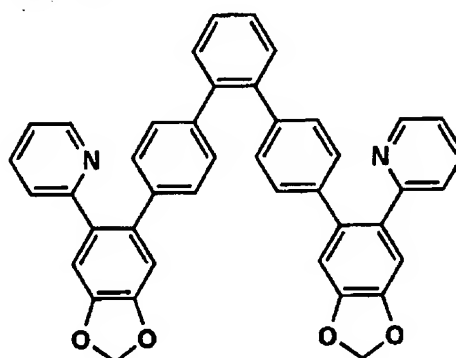
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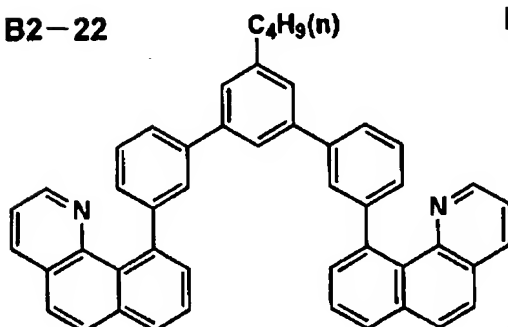
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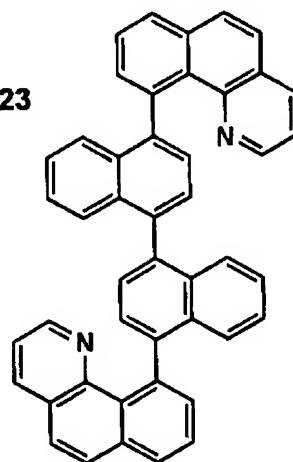
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B2-22



B2-23

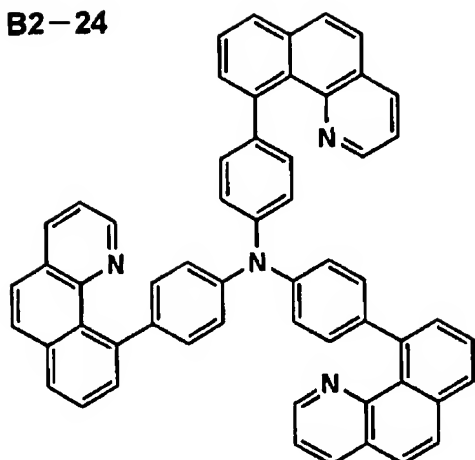




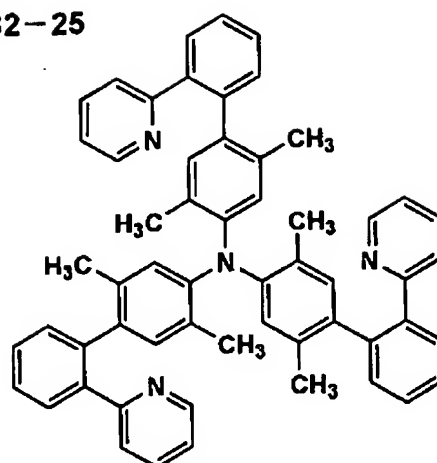
[0202]

[Chemical formula 221]

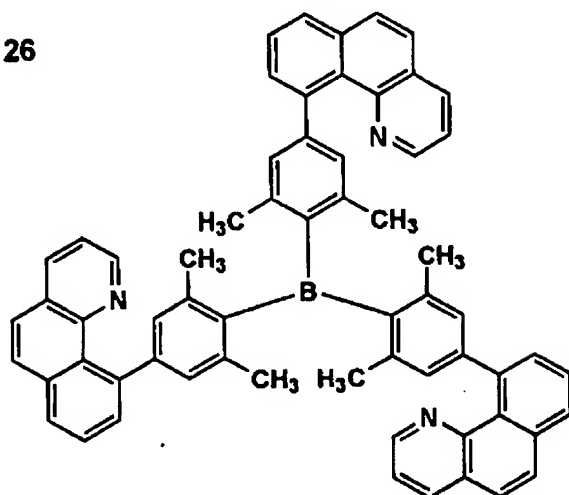
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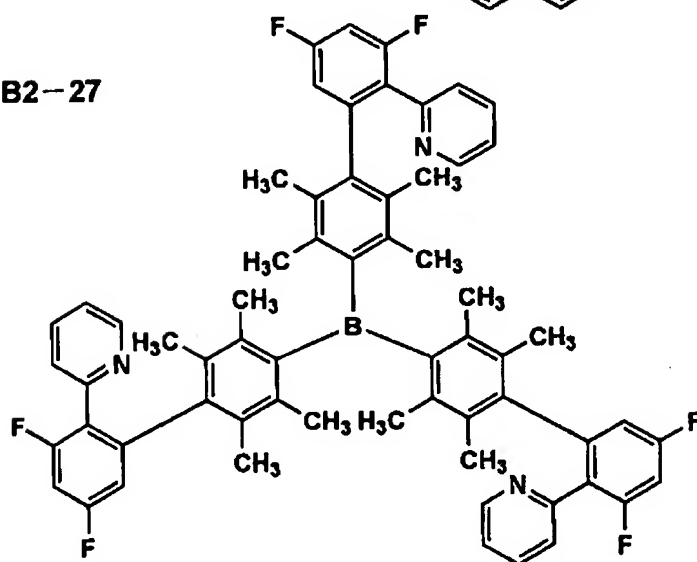
B2-25



B2-26



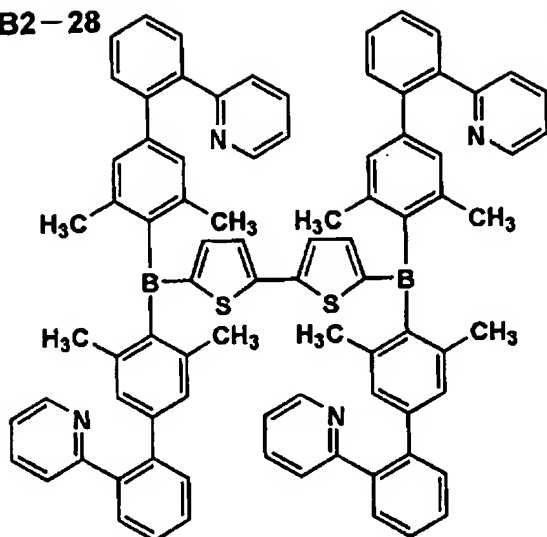
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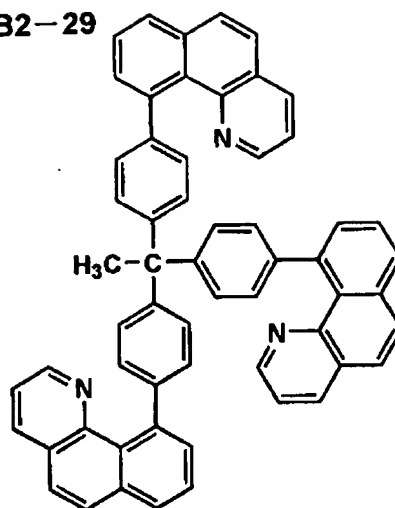
[0203]

[Chemical formula 222]

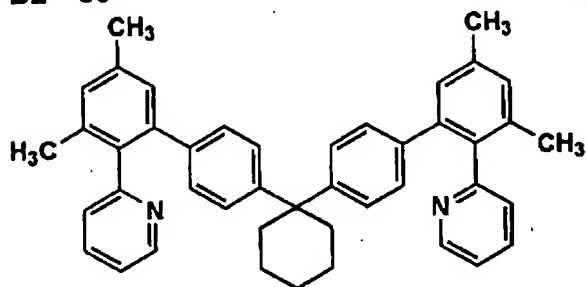
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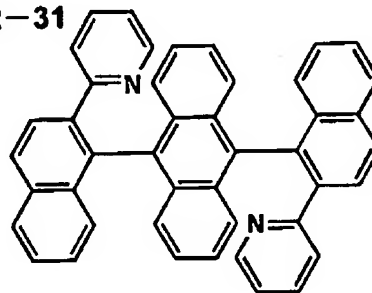
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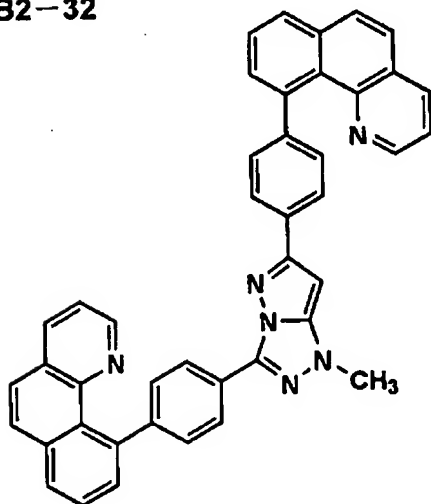
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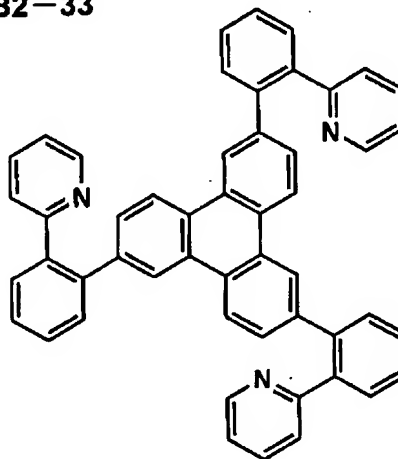
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B2-32



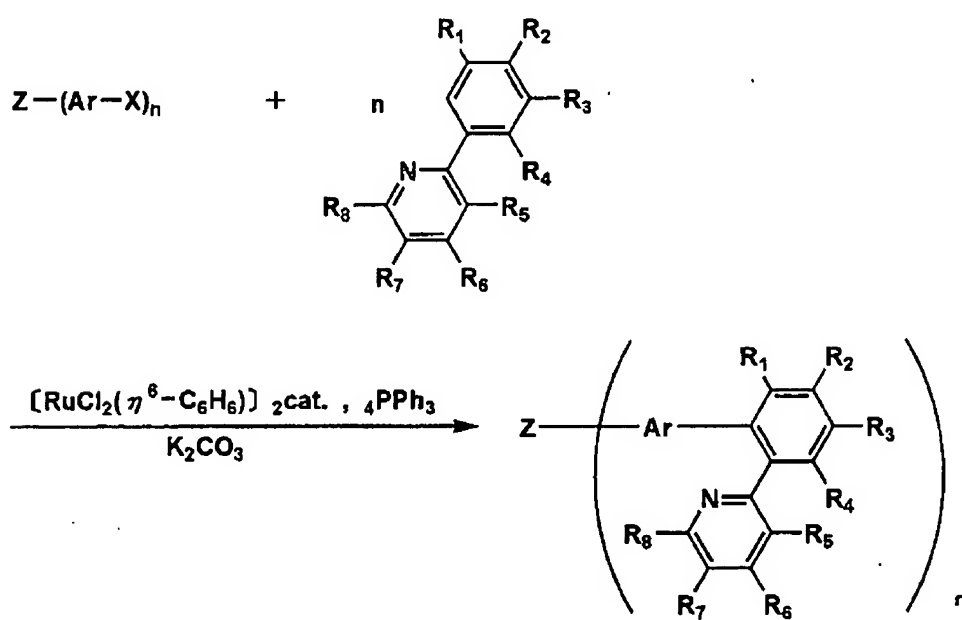
B2-33



[0204] Although the above-mentioned compound concerning this invention is easily compoundable in accordance with a known synthesizing method, it can be compounded simpler by the synthetic route shown below.

[0205]

[Chemical formula 223]



[0206] The above-mentioned reaction is explained to an organic letter magazine, Vol.3, No.16, and p2579 - 2581 (2001) in detail.

[0207] Subsequently, the compound denoted by a general formula (B3-1) is explained.

[0208] In a general formula (B3-1),  $Y_1$  and  $Y_2$  are the divalent machines which can form four

membered-rings - eight membered-rings in a carbon atom respectively.

The ranges of the number of atoms used for frame formation of four membered-rings - eight membered-rings are 0-6 independently respectively.

However, when said number of atoms is 0, the divalent machine denoted by  $Y_1$  or  $Y_2$  expresses a joint hand (a joint hand only expresses a single bond or a double bond here where it is also called combination.).

[0209]<<Divalent machine>>, [ as a divalent machine respectively denoted by  $Y_1$  and  $Y_2$  ] a divalent hydrocarbon group is preferred -- for example, an alkylene machine (for example, a methylene machine.) Alkenylene groups (for example, a BINIREN machine, a pro PENIREN machine, etc.), such as an ethylene group, a trimethylene machine, a tetramethylen machine, a propylene machine, an ethyl ethylene group, a pentamethylene machine, and a hexamethylene machine, and alkynylene group (for example, an ethynylene group, 3-pliers NIREN machine, etc.) are mentioned.

[0210]Here, the carbon atom which constitutes the main chain of the aforementioned alkylene machine, an alkenylene group, and alkynylene group may be partially replaced with the oxygen atom or the sulfur atom.

[0211][ group / which is respectively denoted by  $Z_1$  and  $Z_2$  which form a five-membered ring - eight membered-rings respectively with a carbon atom in a general formula (B3-1) / atomic ] Total of the number of atoms used for frame formation of said five-membered ring - the eight aforementioned membered-ring is a thing of 4-7 respectively, and it is the feature that said main chain forms at least one aromatic series ring and condensed ring respectively.

[0212]<<A five-membered ring - eight membered-rings>>, [ in a general formula (B3-1) ] [ as the five-membered ring which  $Z_1$  and  $Z_2$  form with a carbon atom respectively - eight membered-rings ] Although a cyclopentadiene ring, a 1,4-dihydropyridine ring, gamma-thiopyran ring, gamma-pyran ring, a cyclohexa diene ring, a cycloheptadiene ring, a cyclo-octadiene ring, etc. are mentioned, A cyclopentadiene ring, a 1,4-dihydropyridine ring, gamma-thiopyran ring, gamma-pyran ring, etc. are used preferably especially.

[0213]<<Aromatic series ring which is carrying out condensed ring formation>> In [ again ] a general formula (B3-1), [ as an aromatic series ring which  $Z_1$  and  $Z_2$  form with a carbon atom respectively and which forms an above-mentioned five-membered ring - eight membered-rings, and condensed ring ] an aromatic carbon ring (for example, a benzene ring, a NAFUTAREN ring, and a biphenyl ring.) p-Tell phenyl ring, a diphenyl methane ring, a bird phenyl methane ring, a BIBENJIRU ring, a SUCHIRUBEN ring, an indene ring, a tetra-phosphorus ring, an anthracene ring, a phenanthrene ring, etc. and an aromatic heterocycle machine -- for example, A furan ring, a pyrrole ring, a pyrazole ring, an imidazole ring, an oxazole ring, A thia ZORU ring, 1 and 2, 3-oxadiazole ring, 1 and 2, 3-triazole ring, A 1,2,4-triazole ring, a 1,3,4-thiadiazole ring, a pyridine ring, A PIRIDAJIN ring, a pyrimidine ring, a pyrazine ring, s-triazine ring, a benzofuran ring, an indole ring, a benzothiophene ring, a benzimidazole ring, a benzothia ZORU ring, a pudding ring, a quinoline ring, isoquinoline ring Hitoshi, etc. are mentioned.

[0214]As an aromatic series ring preferably used also in the above, a benzene ring, a biphenyl ring, a SUCHIRUBEN ring, etc. are mentioned.

[0215]In the general formula (B3-1), the aromatic series ring which  $Z_1$  and  $Z_2$  form with a carbon atom respectively and which forms an above-mentioned five-membered ring - eight membered-rings, and condensed ring may be the same, or may differ.

[0216]<<Substituent on an aromatic series ring>> again, [ the above-mentioned aromatic series ring ] May have a substituent and, [ as said substituent ] for example, an alkyl group (for example, a methyl group, an ethyl group, and an iso-propyl group.) A hydroxyethyl machine, a methoxymethyl machine, a trifluoromethyl group, a tert-butyl group, Alkenyl groups, such as a cyclopentyl group, a cyclohexyl group, and a benzyl group. (For example, a vinyl group, a propenyl machine, a styryl machine, etc.), and alkynyl groups. (for example, an ethynyl group) etc. and aryl groups (for example, a phenyl group and a naphthyl group.) Alkoxy groups, such as p-trill machine and p-chlorophenyl machine. (For example, a methoxy group, an ethoxy basis, an iso-propoxy group, a butoxy machine, etc.), Aryloxy groups (for example, phenoxy group etc.), an alkylthio group. (For example, a methylthio group, an ethyl thio group, an iso-pro PIRUKIO machine, etc.), Arylthio groups (for example, a phenylthio group, the Naff Chill thio group, etc.), a halogen atom. (for example, a fluorine atom, a chlorine atom, a bromine

atom, an iodine atom, etc.), amino groups (for example, a dimethylamino group, a methylamino machine, a diphenylamino machine, etc.), a cyano group, a nitro group, and a heterocyclic machine (for example, a pyrrolyl machine, a pyrrolidinyl machine, a pyrazolyl machine, and an imidazolyl group.) a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, a benzoxazolyl machine, etc. -- etc. -- it is mentioned. As an aromatic series machine, the above-mentioned aryl group and heteroaryl groups (a pyrrole group, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzoimidazolyl group, a benzothiazolyl machine, benzoxazolyl, etc.) may be mentioned, and each substituent may be replaced by still more arbitrary substituents.

[0217]The compound denoted by a general formula (B3-2) is explained.

[0218]In a general formula (B3-2), the basis respectively denoted by  $Y_1$ ,  $Y_2$ ,  $Y_3$ , and  $Y_4$  is synonymous with the basis respectively denoted by  $Y_1$  and  $Y_2$  in said general formula (B3-1). In a general formula (B3-2), the basis respectively denoted by  $Z_1$  and  $Z_2$  is synonymous with the basis respectively denoted by  $Z_1$  and  $Z_2$  in said general formula (B3-1).

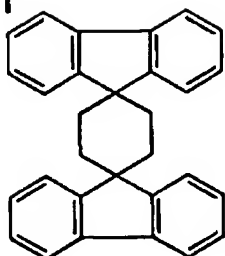
[0219]Although the example of a compound denoted by said general formula (B3-1) or (B3-2) below is shown, this invention is not limited to these.

[0220]

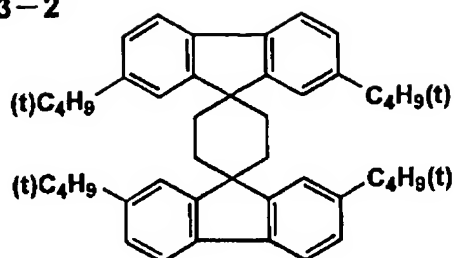


[Chemical formula 224]

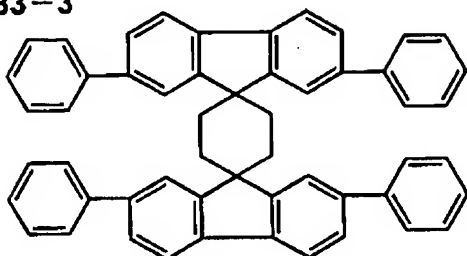
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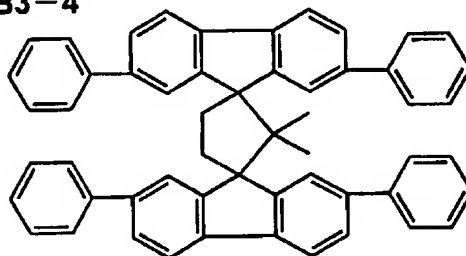
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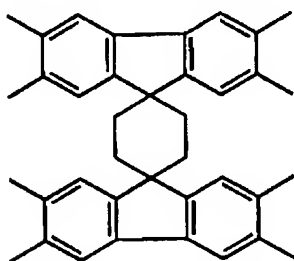
B3-3



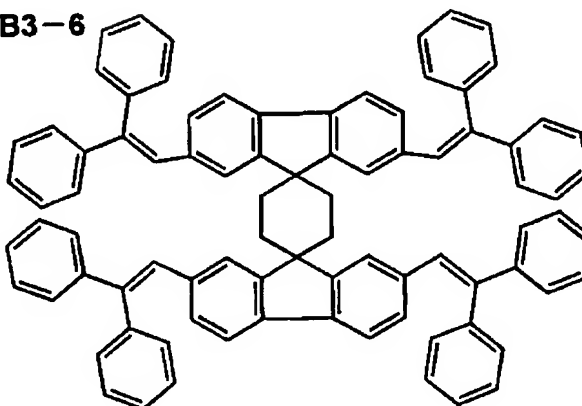
B3-4



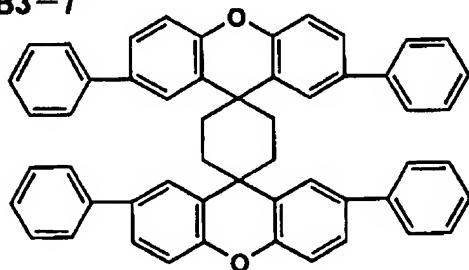
B3-5



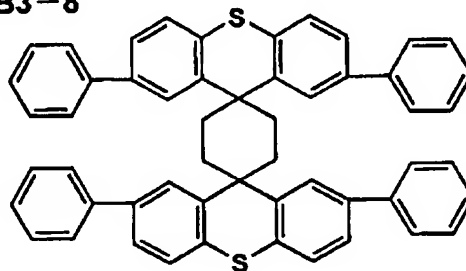
B3-6



B3-7

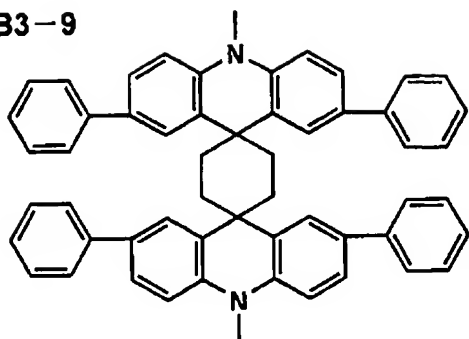
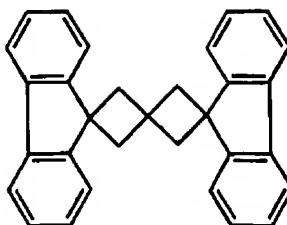
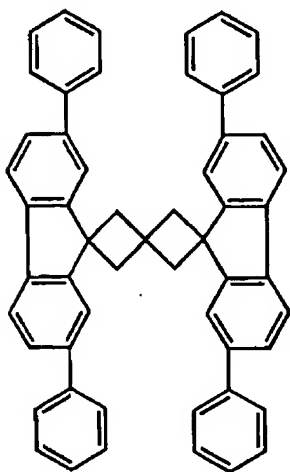
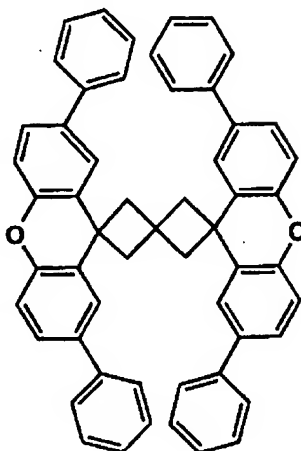
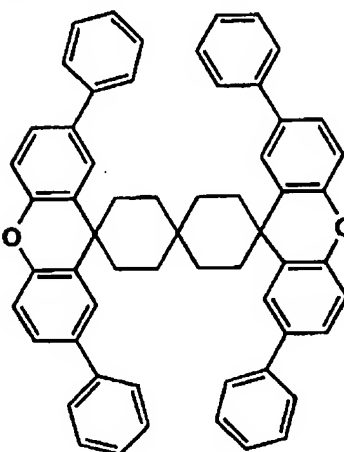
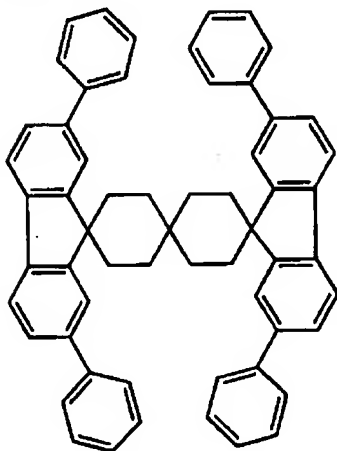
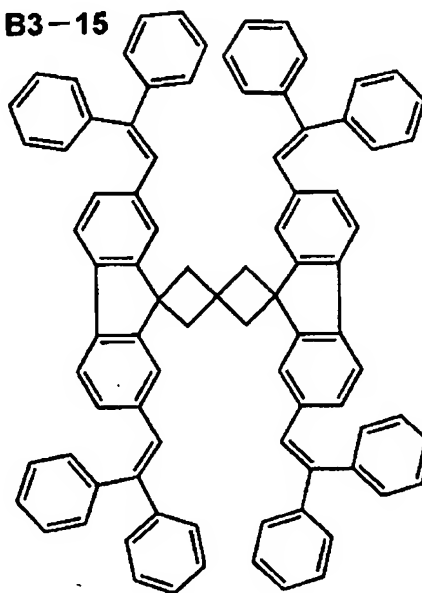


B3-8



[0221]

[Chemical formula 225]

**B3-9****B3-10****B3-11****B3-12****B3-13****B3-14****B3-15**

[0222]The compound denoted by said general formula (B3-1) or (B3-2) is compoundable with reference to the method of a description to J.Chem.Soc. and Chem.Commun.309-310 (1998), Tetrahedron Lett.3855-3856 (2001), etc.

[0223]The above-mentioned compound concerning this invention is containing in the luminous layer mentioned later or an electron transport layer preferably.

[0224]The compound denoted by said general formula (B3-1) or (B3-2) is a compound in which strong fluorescence is shown in a solid state.

It excels also in electric field luminescence and can be effectively used as a luminescent material of an organic EL device.

Since it excels in electronic pouring nature and electron transport property outstanding from the metal electrode very much, When the compound denoted by said general formula (B3-1) or (B3-2) was used as an electronic transportation material (or hole blocker), this invention persons also found out collectively that an organic EL device showed the outstanding luminous efficiency.

[0225]The compound denoted by a general formula (B4-1) is explained.

[0226][ as a substituent denoted by  $R_1$  and  $R_2$  ] an alkyl group (a methyl group, an ethyl group, i-propyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, alkenyl groups (a vinyl group and a propenyl machine.), such as a cyclohexyl group and a benzyl group alkynyl groups (ethynyl group etc.), such as a styryl machine, and an aryl group (a phenyl group.) alkyloxy machines (a methoxy group.), such as a naphthyl group, p-trill machine, and p-chlorophenyl machine Aryloxy groups, such as an ethoxy basis, i-propoxy group, and a butoxy machine (phenoxy group etc.), An alkylthio group (a methylthio group, an ethyl thio group, i-propyl thio group, etc.), arylthio groups (phenylthio group etc.) and a halogen atom (a fluorine atom.) amino groups (a dimethylamino group.), such as a chlorine atom, a bromine atom, and an iodine atom A cyano group, a nitro group, heterocyclic machines, etc. (a pyrrole group, a pyrrolidyl machine, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, a benzoxazolyl machine, etc.), such as a methylamino machine and a

diphenylamino machine, are mentioned. As an aromatic series machine, the above-mentioned aryl group and heteroaryl groups (a pyrrole group, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, benzoxazolyl, etc.) may be mentioned, and each substituent may be replaced by still more arbitrary substituents. Adjoining substituents may be condensed mutually and they may form a ring.

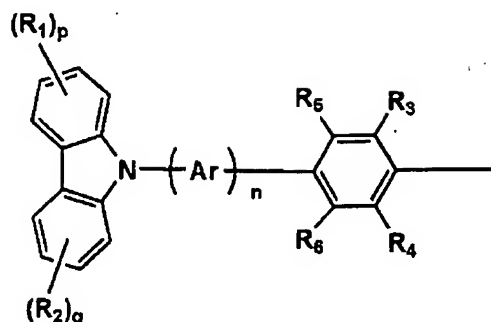
[0227]Although  $R_3 - R_6$  express a hydrogen atom or a substituent, the example is synonymous with said  $R_1$ . Although either [ at least ]  $R_3$  or  $R_4$  expresses a substituent, especially a desirable substituent is an alkyl group.

[0228]The divalent Ally Wren machine denoted by Ar is a residue which removed a hydrogen atom or two substituents from the arbitrary positions of arbitrary aromatic compounds. Even if it comprises hydrocarbon, the Ally Wren machine may be the heterocycle containing a hetero atom, or may be condensed.

[0229]As an aryl group denoted by  $Ar_1$  and  $Ar_2$ , it may be an aromatic hydrocarbon ring machine, or may be an aromatic heterocycle machine, and also the condensed ring may be formed. As an example, a phenyl group, 1-naphthyl group, 9-anthryl group, 9-phenanthrene machine, 2-pyridyl group, 4-quinolyl machine, 2-thienyl group, etc. are mentioned. Either one of  $Ar_1$  or  $Ar_2$

[0230]

[Chemical formula 226]



[0231]It comes out and being expressed is preferred.

[0232]The compound of this invention is a compound which has strong fluorescence in a solid state.

It excels also in electric field luminescence and can be effectively used as a luminescent material.

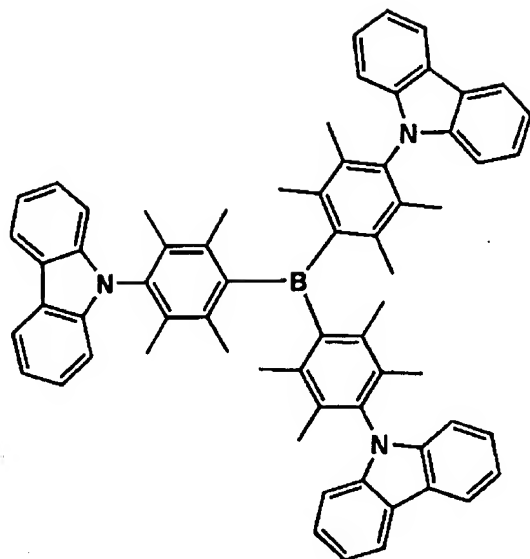
Since it excels in electronic pouring nature and electron transport property outstanding from the metal electrode very much, in the element using other luminescent materials or the compound of this invention as a luminescent material, the luminous efficiency which was excellent when the compound of this invention was used as an electronic transportation material (or hole blocker) is shown.

[0233]Although the example of a concrete compound is given to below, this invention is not limited to these.

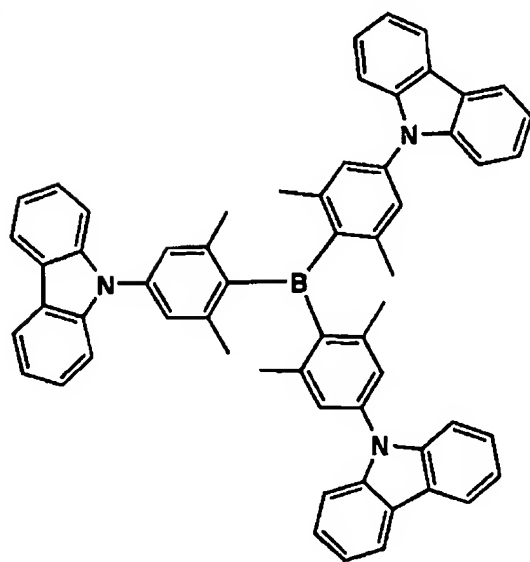
[0234]

[Chemical formula 227]

**B4-1**



**B4-2**

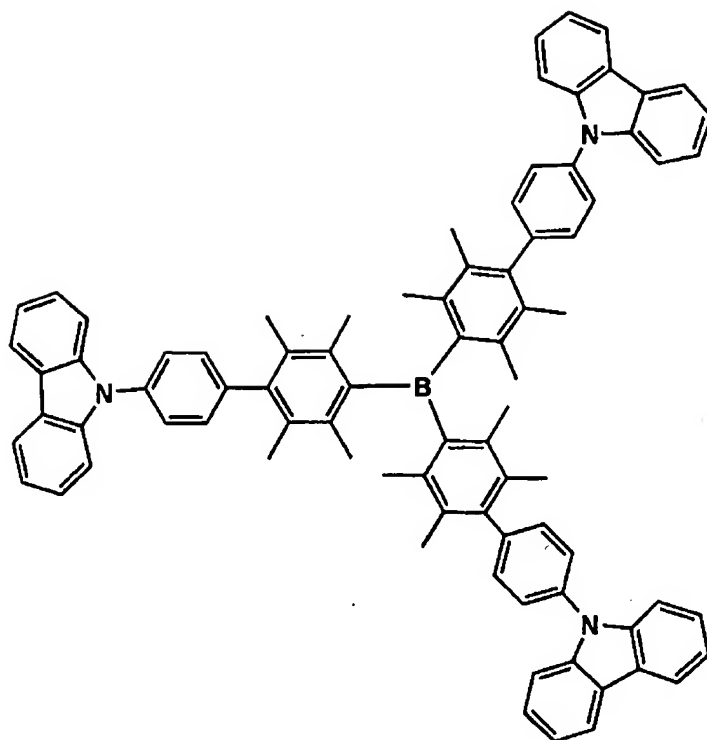




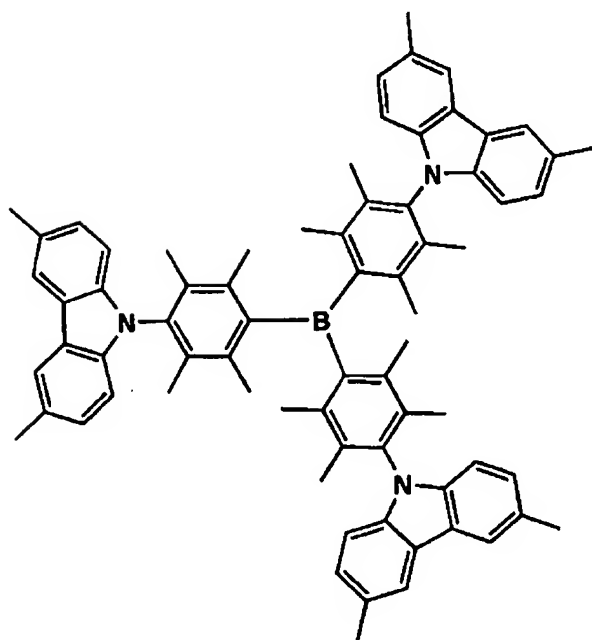
[0235]

[Chemical formula 228]

B4-3



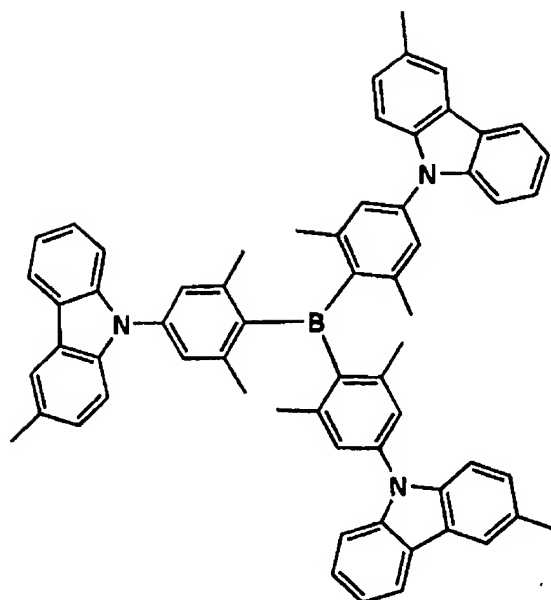
B4-4



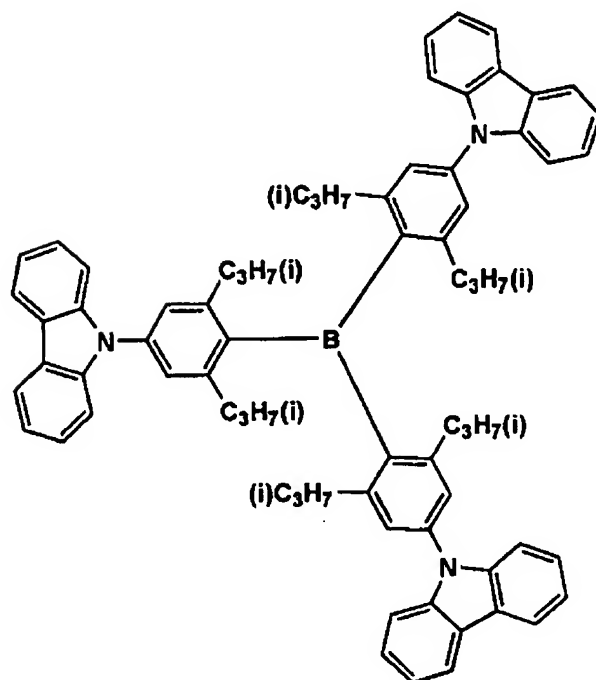
[0236]

[Chemical formula 229]

B4-5

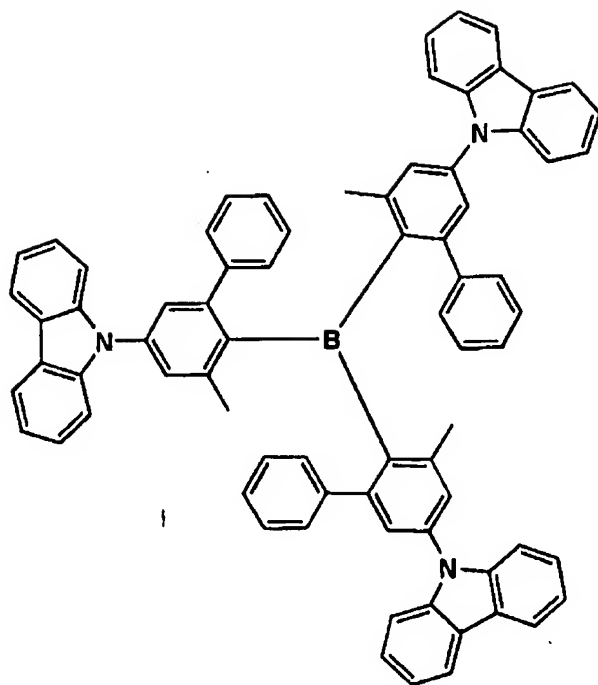
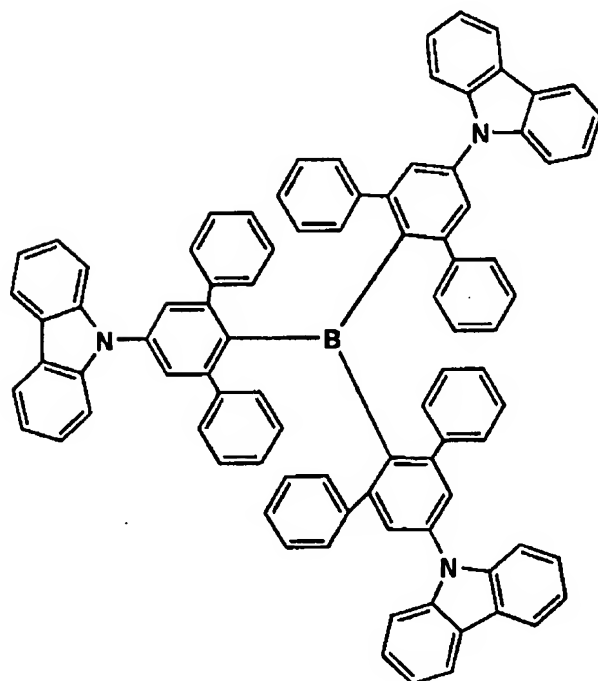


B4-6



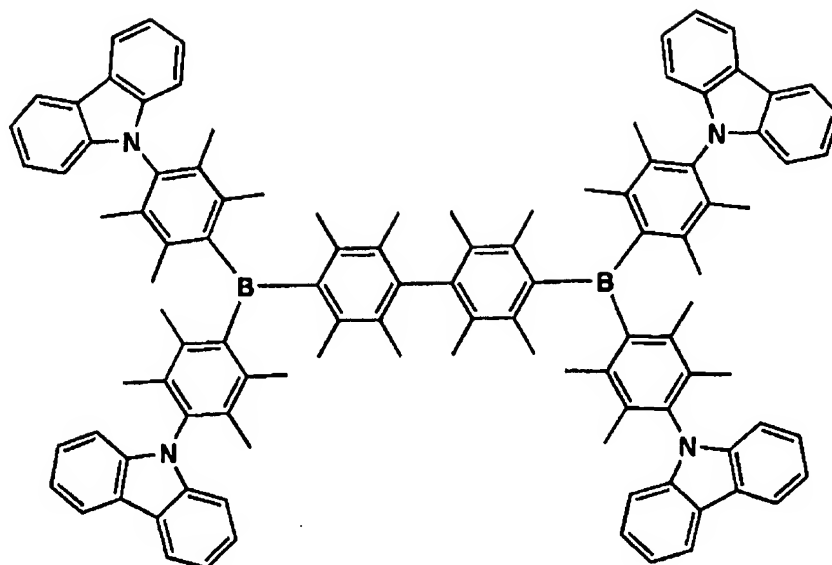
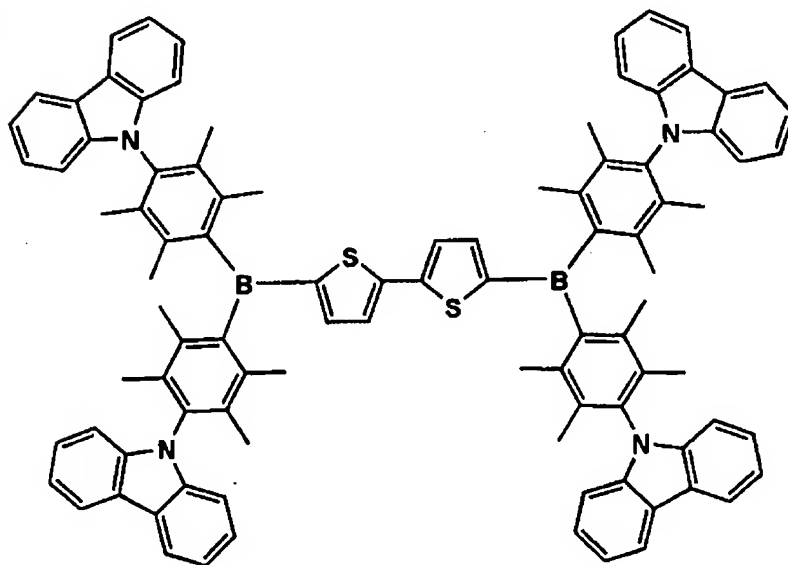
[0237]

[Chemical formula 230]

**B4-7****B4-8**

[0238]

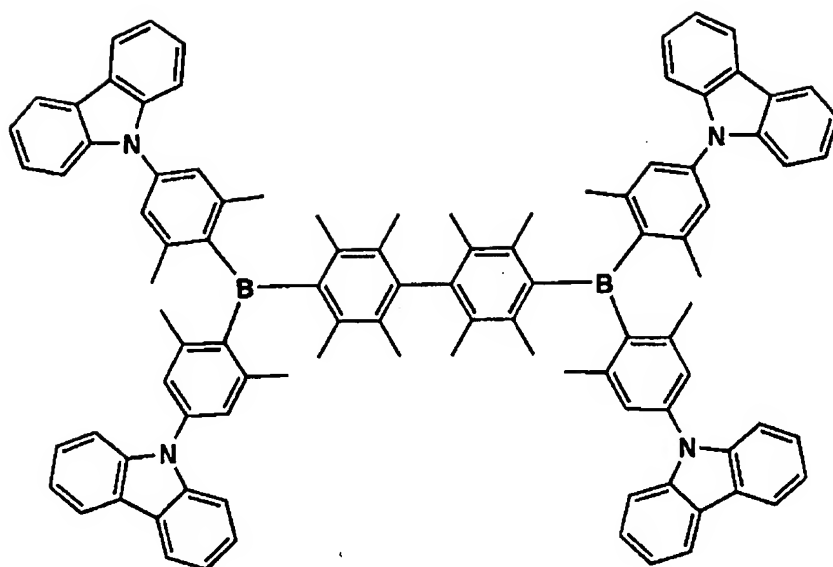
[Chemical formula 231]

**B4-9****B4-10**

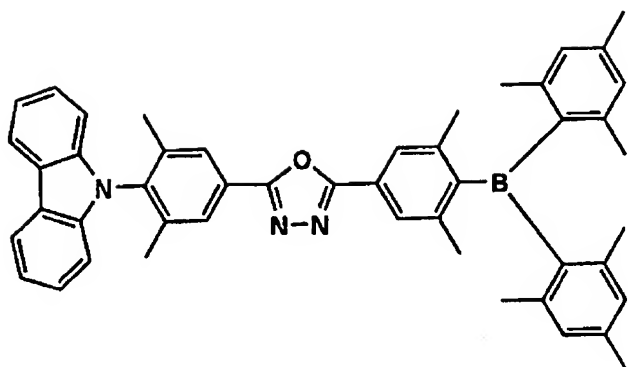
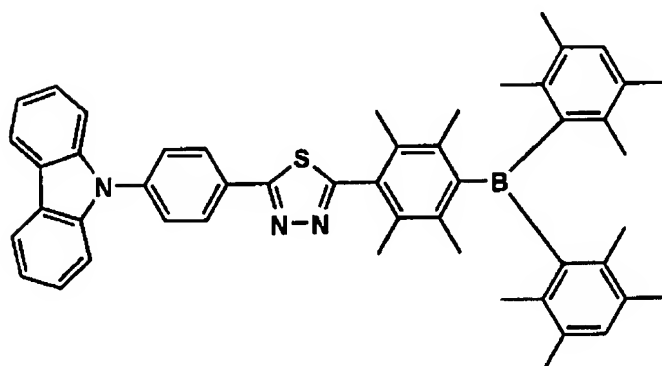
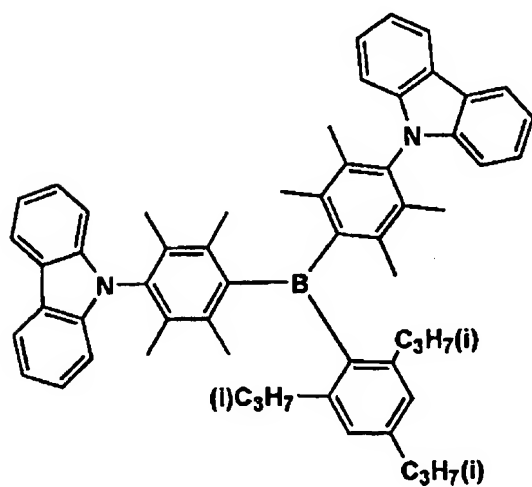
[0239]

[Chemical formula 232]



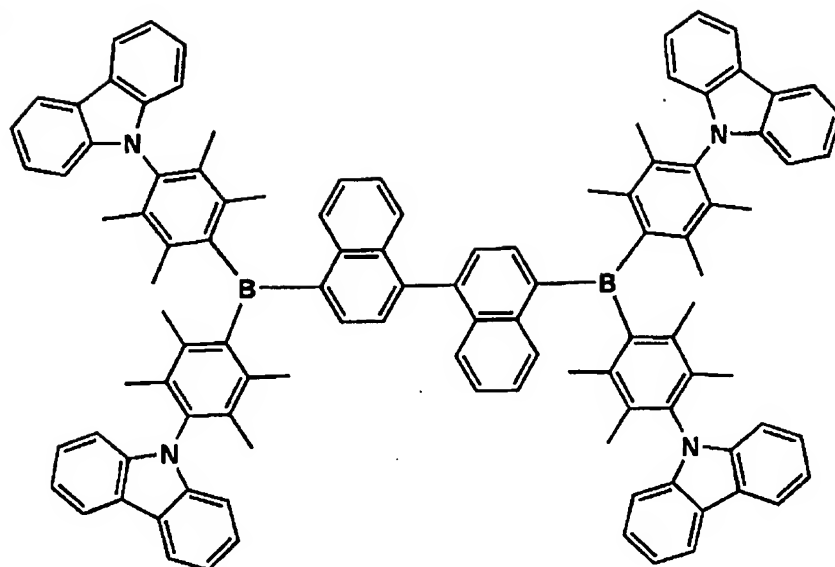
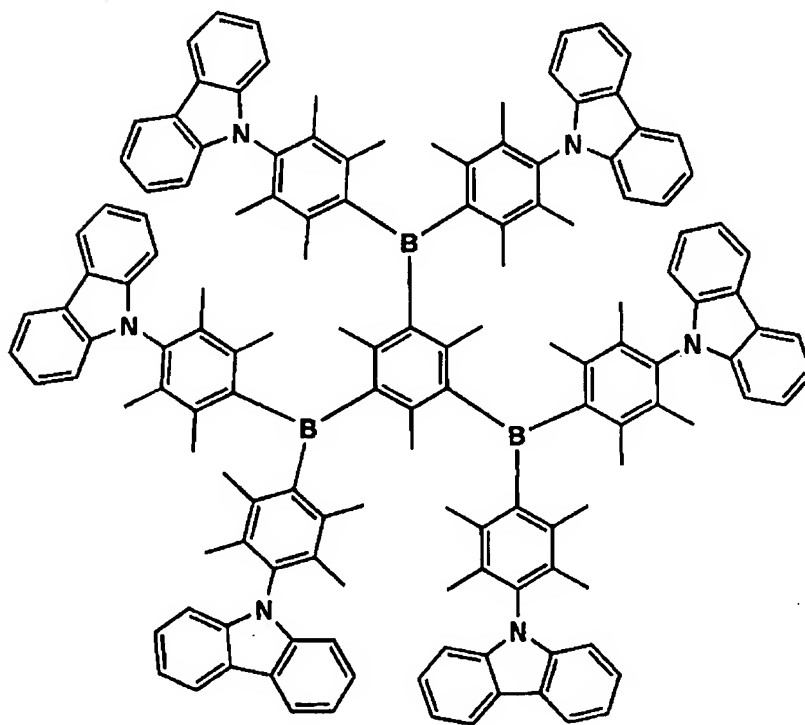
**B4-11**

[Chemical formula 233]

**B4-14****B4-15****B4-16**

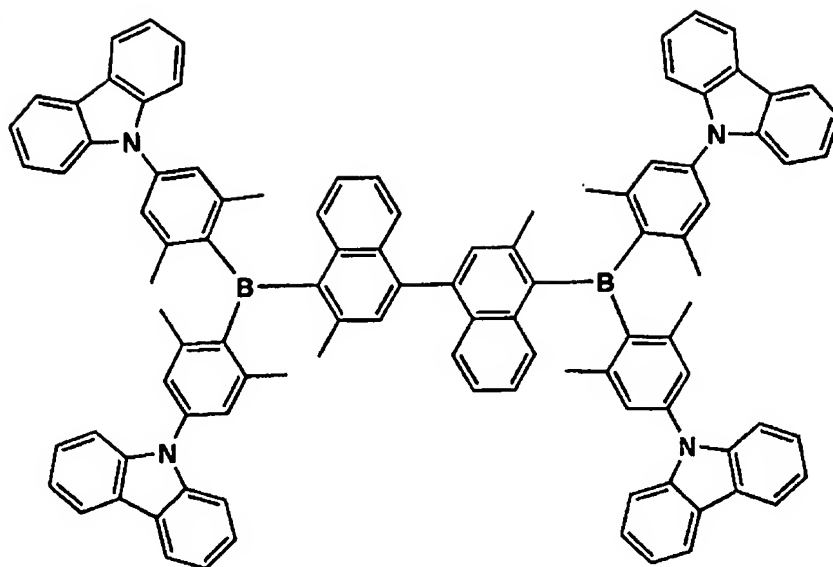
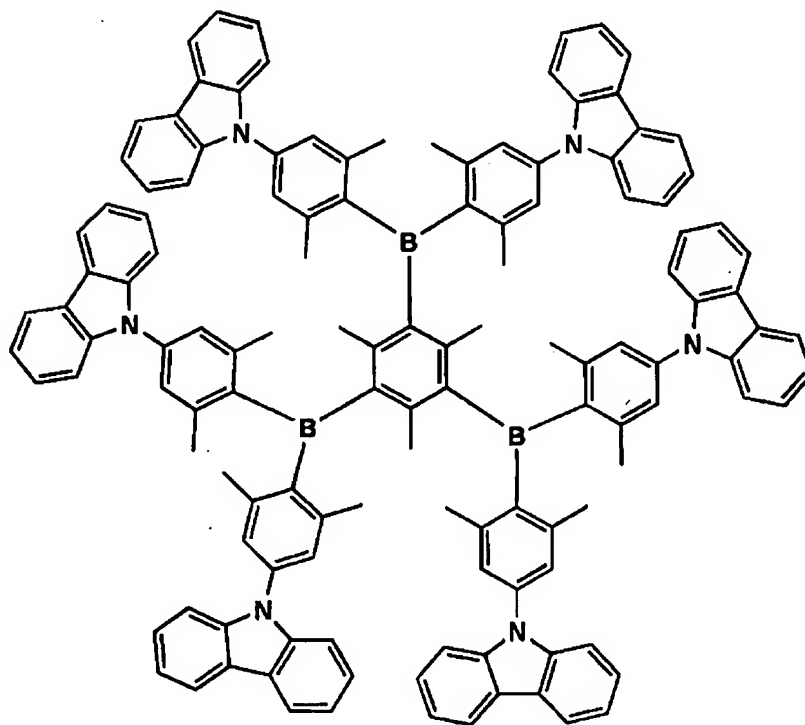
[0241]

[Chemical formula 234]

**B4-17****B4-18**

[0242]

[Chemical formula 235]

**B4-19****B4-20**

[0243]The compound of this invention is compoundable according to the method of JP,2001-

93670,A and J.Am.Chem.Soc.120, and p.9714 (1998) description.

[0244]The compound denoted by a general formula (B5-1) is explained.

[0245] $R_{11}$  -  $R_{14}$  express the substituent of a hydrogen atom or 1 value among a formula, and at least one expresses the substituent combined via a carbon atom, an oxygen atom, a sulfur atom, or a silicon atom.

[0246][ as a substituent of the 1 value denoted by  $R_{11}$  -  $R_{14}$  ] an alkyl group (a methyl group, an ethyl group, i-propyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, aryl groups (a phenyl group and a naphthyl group.), such as a cyclohexyl group and a benzyl group alkenyl groups (a vinyl group.), such as p-trill machine and p-chlorophenyl machine alkynyl groups (ethynyl group etc.) and alkyloxy machines (a methoxy group.), such as a propenyl machine and a styryl machine Aryloxy groups, such as an ethoxy basis, i-propoxy group, and a butoxy machine (phenoxy group etc.), An alkylthio group (a methylthio group, an ethyl thio group, i-pro PIRUKIO machine, etc.), arylthio groups (phenylthio group etc.), an amino group, and an alkylamino group (a dimethylamino group.) arylamino machines (an ANIRINO machine.), such as a diethylamino machine and an ethyl methylamino machine halogen atoms (a fluorine atom, a chlorine atom, and a bromine atom.), such as a diphenylamino machine A cyano group, a nitro group, heterocyclic machines (a pyrrole group, a pyrrolidyl machine, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, a benzoxazolyl machine, etc.), such as an iodine atom, Silyl groups (a trimethylsilyl machine, t-butyl dimethylsilyl group, a dimethylphenyl silyl group, a bird phenyl silyl group, etc.) etc. are mentioned.

[0247]Each substituent may have a substituent further. Substituents may join together and a ring may be formed.

[0248]In a general formula (B5-1), at least one of  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ , and  $R_{14}$  is a hydrocarbon aromatic series machine (the above-mentioned aryl group) preferably, and it is a case where it



is expressed with a general formula (B5-2) still more preferably.

[0249]In a general formula (2),  $Ar_{21} - Ar_{23}$  express an aromatic series machine, and  $R_{21} - R_{23}$  express the substituent of 1 value.  $l$ ,  $m$ , and  $n$  express the integer of 0-4, respectively.

[0250] $R_{21} - R_{23}$  are alkyl groups preferably, and it is a case where  $l$ ,  $m$ , and  $n$  are 2-4, and is a time of at least one of  $Ar_{21} - Ar_{23}$  being a thienyl group still more preferably. When  $l$ ,  $m$ , and  $n$  are 2-4, two or more corresponding  $R_{21}$ ,  $R_{22}$ , and  $R_{23}$  may be the same, or may differ from each other.

[0251]That it is also a condensed ring of the specific structure denoted by a general formula (B5-3) has a preferred compound denoted by a general formula (B5-1).

[0252]In a general formula (B5-3),  $R_{31}$  expresses the substituent of a hydrogen atom or 1 value,  $n_3$  expresses 0-2, and  $Z_3$  expresses an atomic group required to form a five-membered ring.

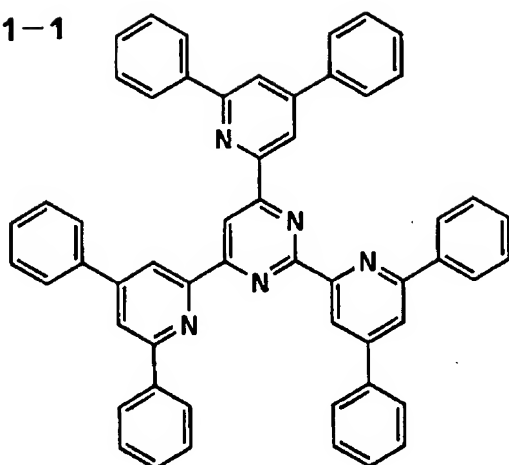
[0253]The five-membered ring formed by  $Z_3$  may have a substituent further. As a substituent of the 1 value denoted by  $R_{31}$ , the same thing as  $R_{11} - R_{14}$  is mentioned. When  $n_3$  is 2, two or more  $R_{31}$  may be the same, or may differ.

[0254]Although the example of a concrete compound is shown below, it is not limited to these.

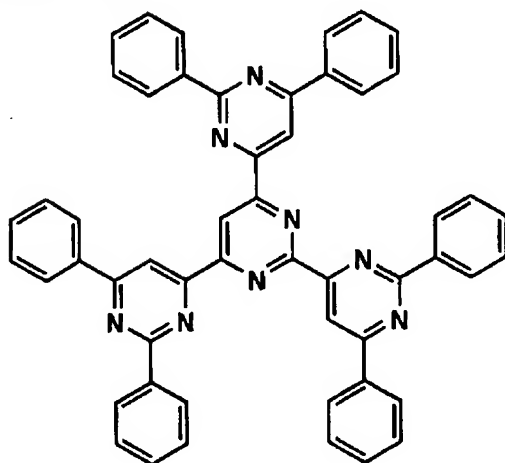
[0255]

[Chemical formula 236]

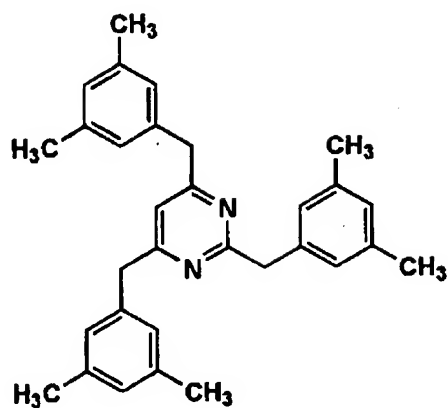
B5-1-1



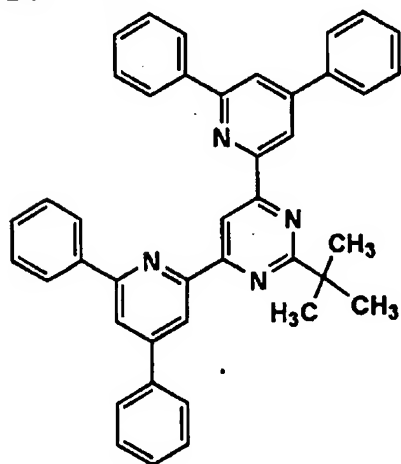
B5-1-2



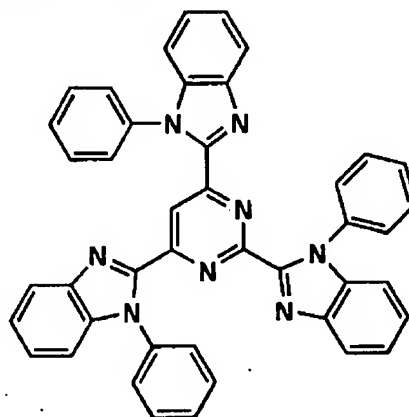
B5-1-3



B5-1-4



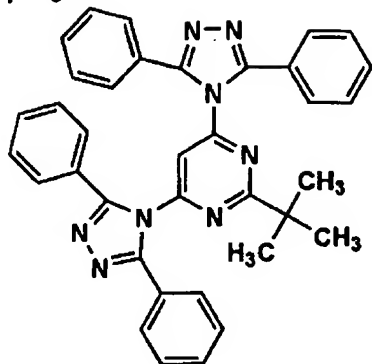
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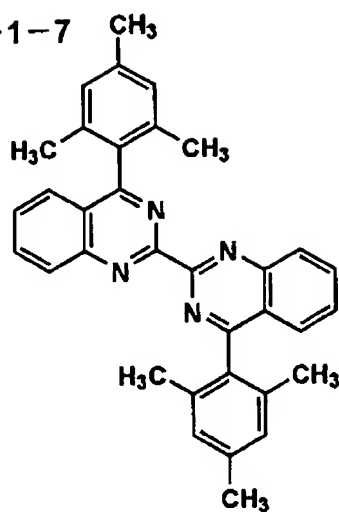
[0256]

[Chemical formula 237]

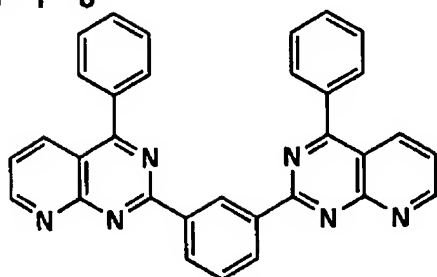
B5-1-6



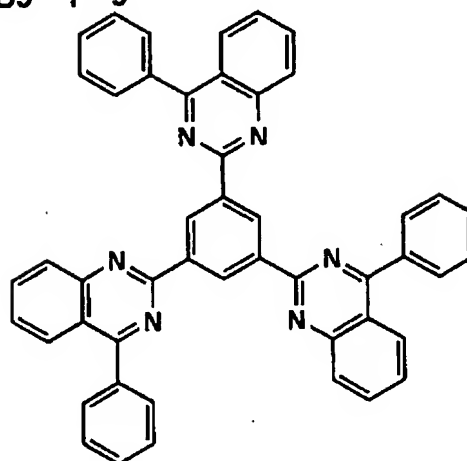
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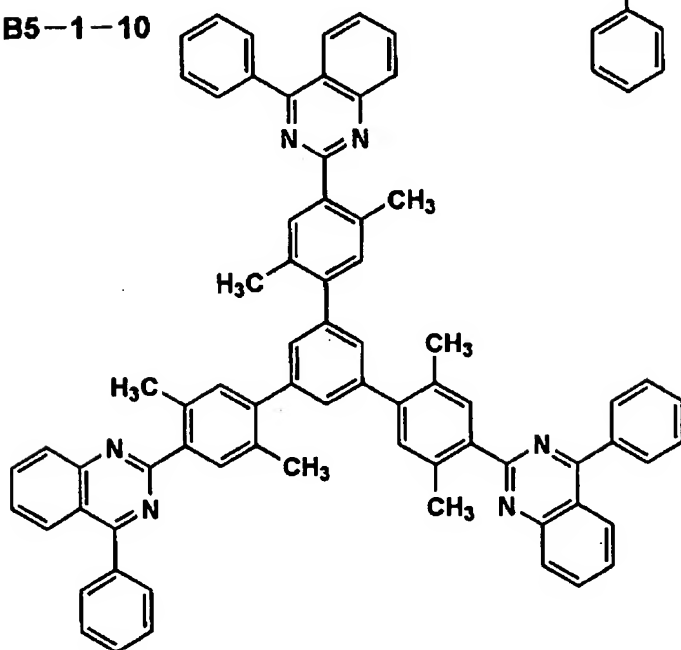
B5-1-8



B5-1-9



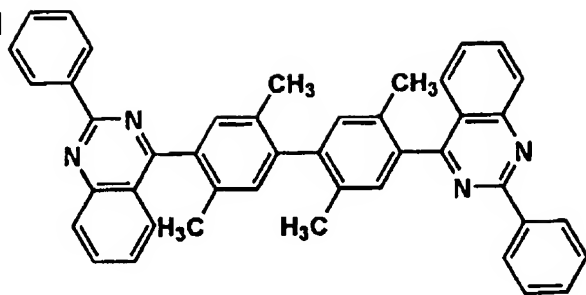
B5-1-10



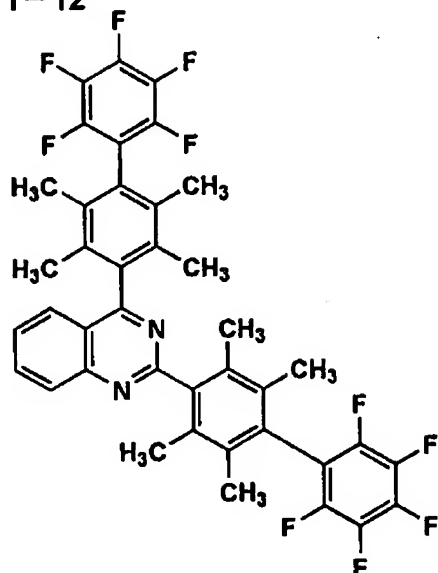
[0257]

[Chemical formula 238]

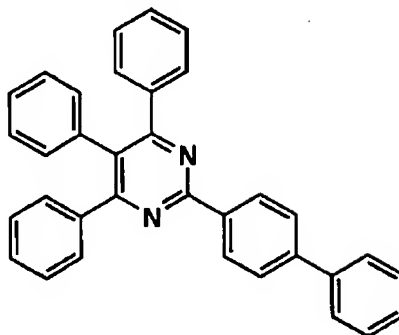
B5-1-11



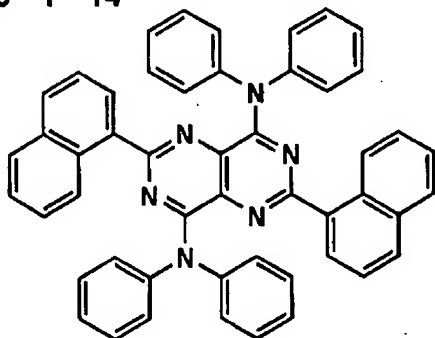
B5-1-12



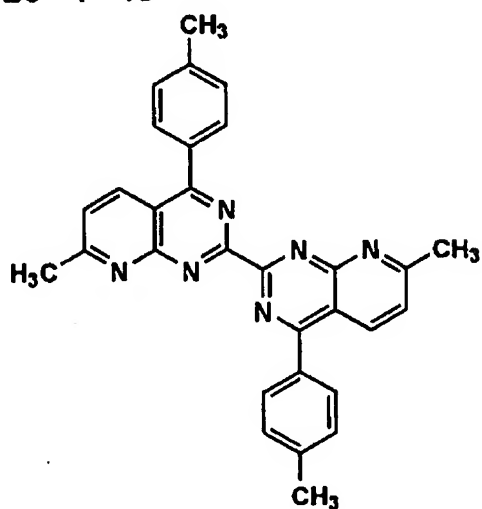
B5-1-13



B5-1-14



B5-1-15

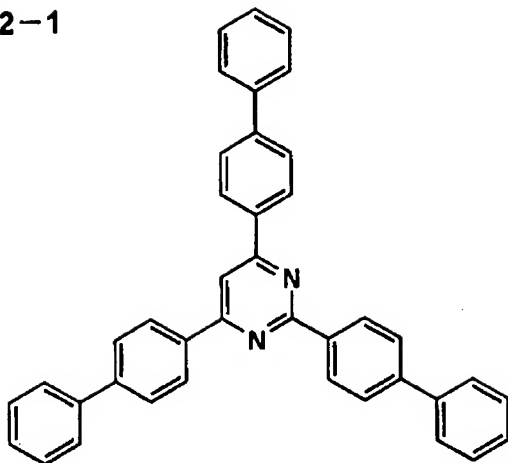


[0258]

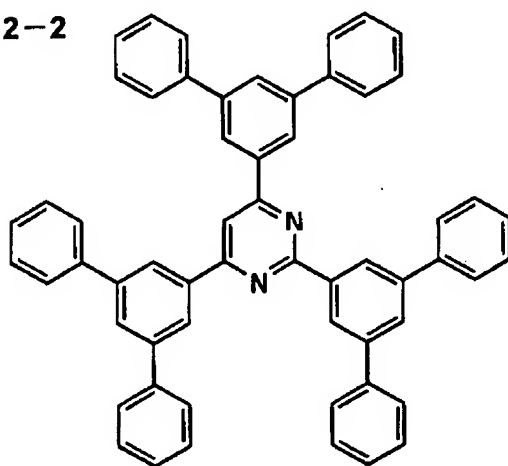
[Chemical formula 239]



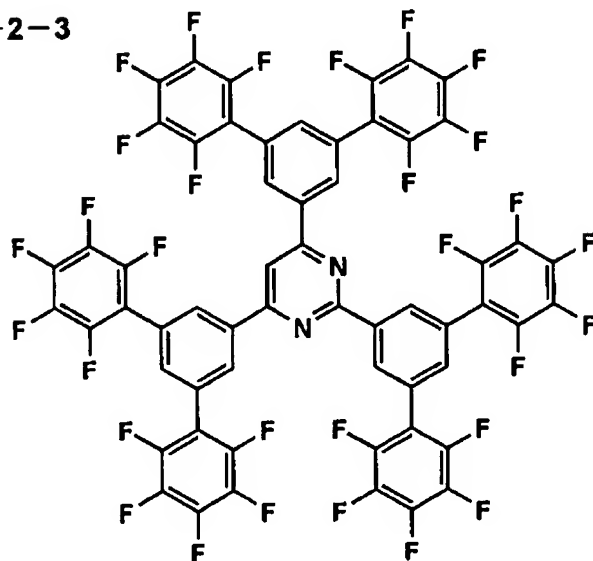
B5-2-1



B5-2-2



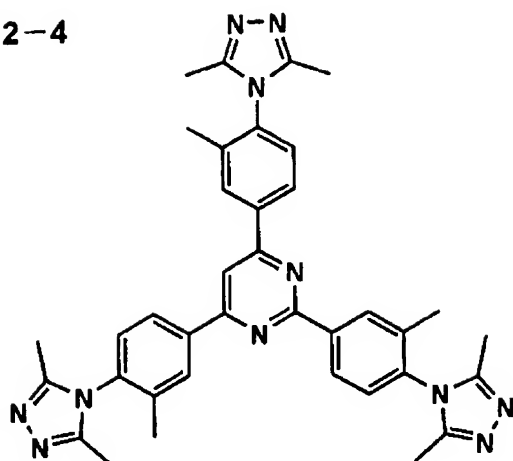
B5-2-3



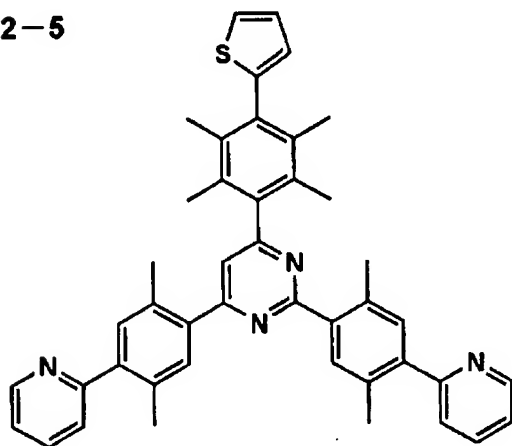
[0259]

[Chemical formula 240]

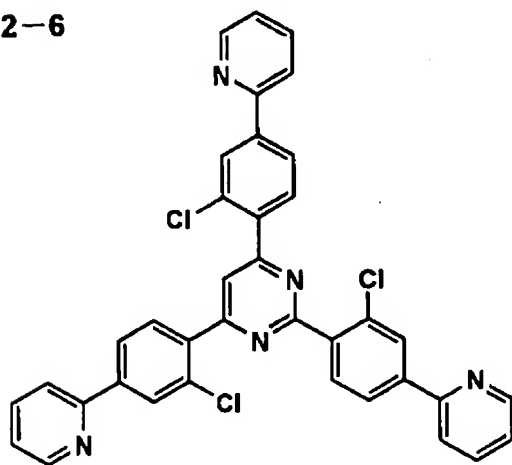
B5-2-4



B5-2-5



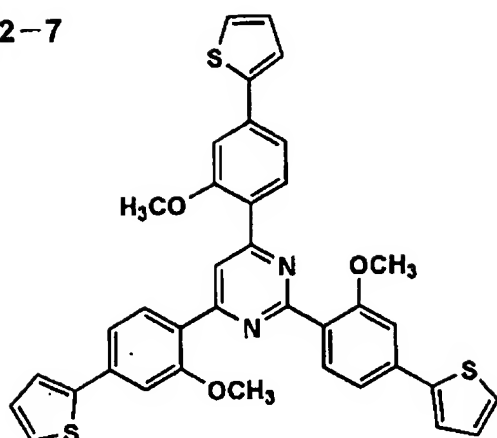
B5-2-6



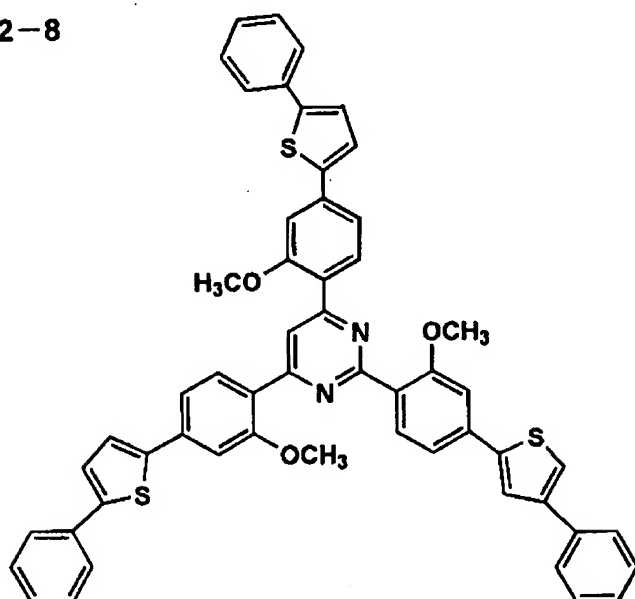
[0260]

[Chemical formula 241]

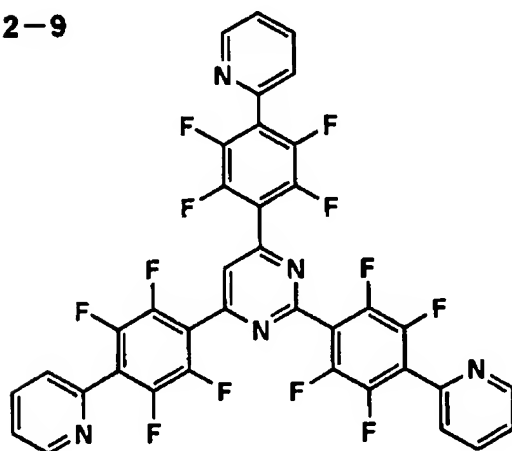
B5-2-7



B5-2-8



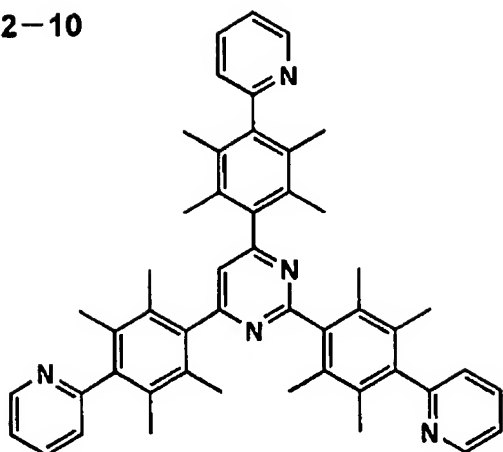
B5-2-9



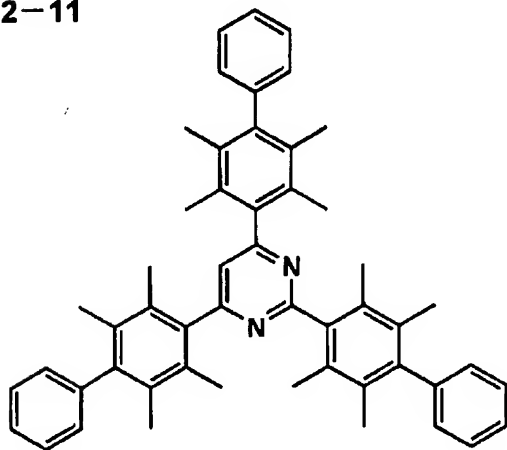
[0261]

[Chemical formula 242]

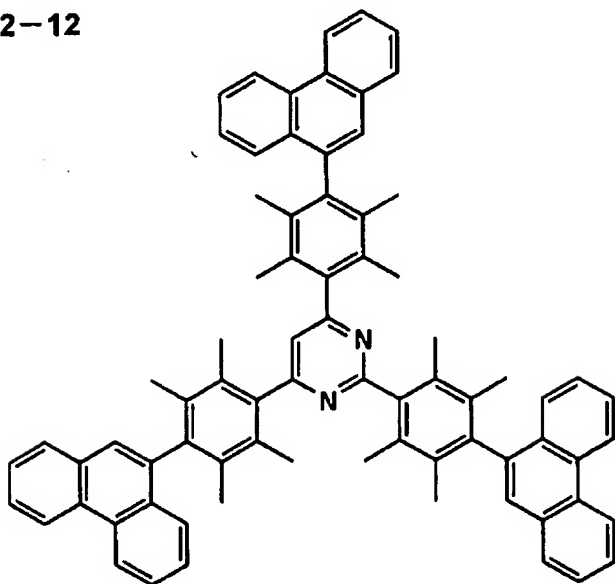
B5-2-10



B5-2-11

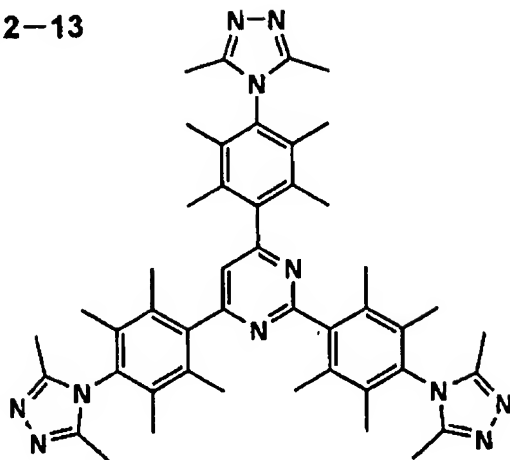
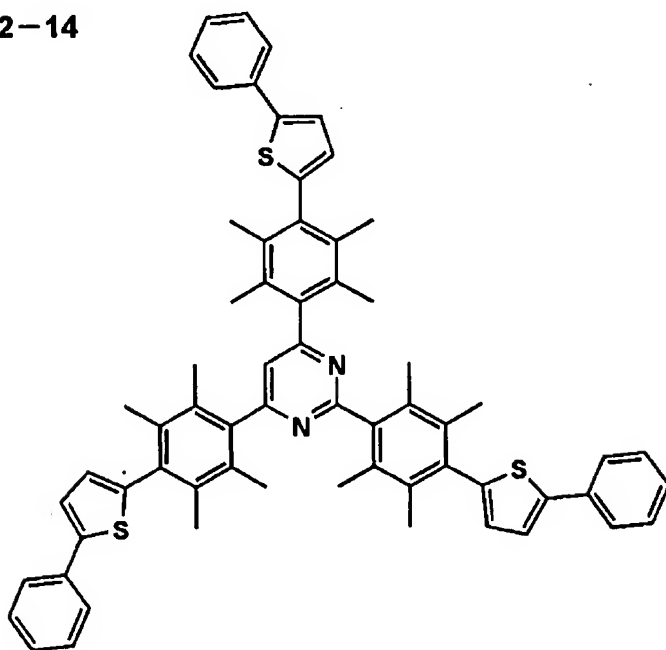


B5-2-12



[0262]

[Chemical formula 243]

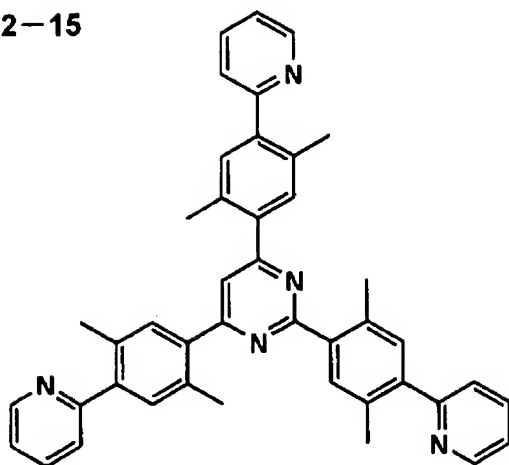
**B5-2-13****B5-2-14**

[0263]

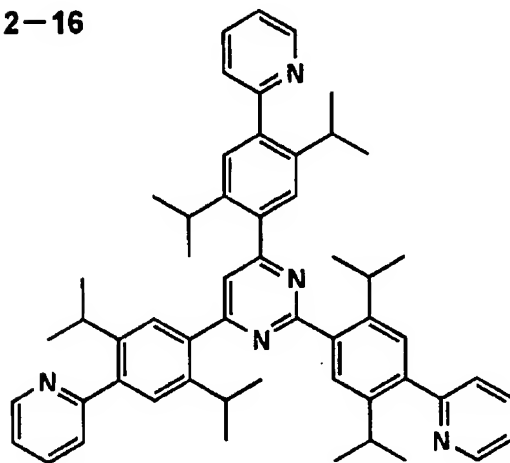


[Chemical formula 244]

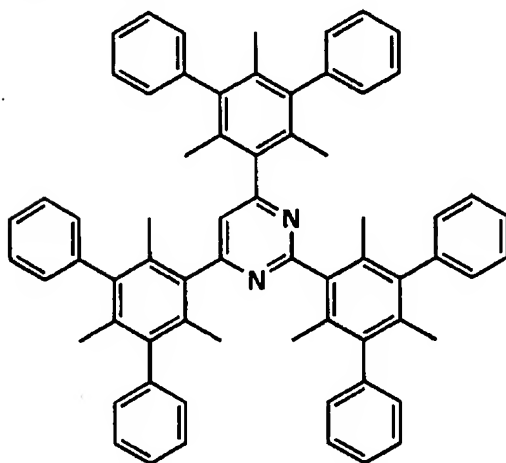
B5-2-15



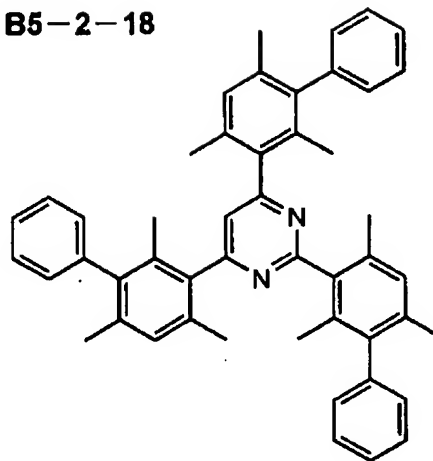
B5-2-16



B5-2-17

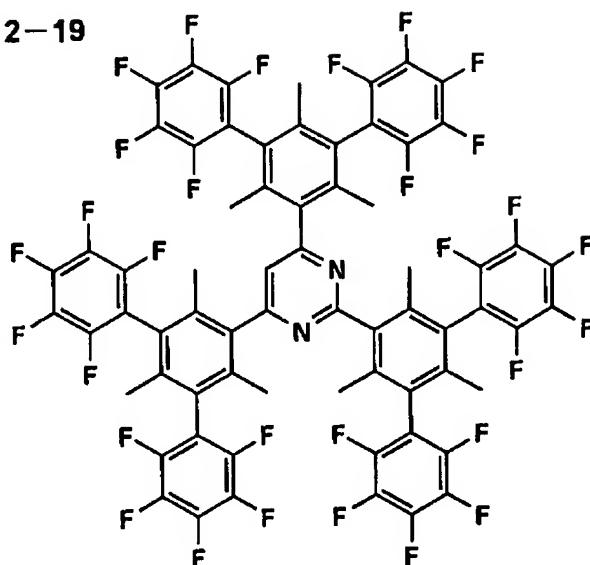
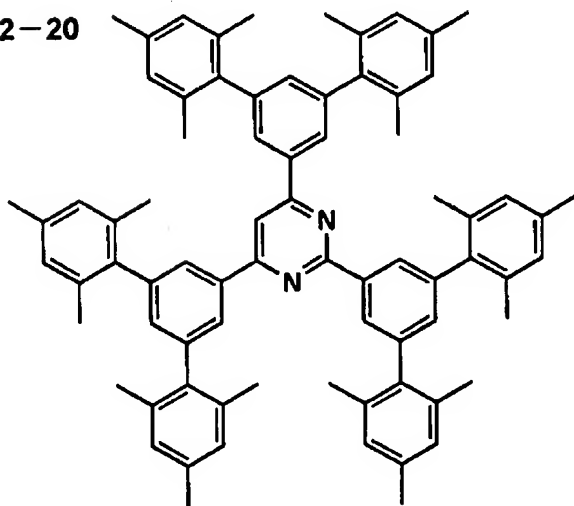


B5-2-18



[0264]

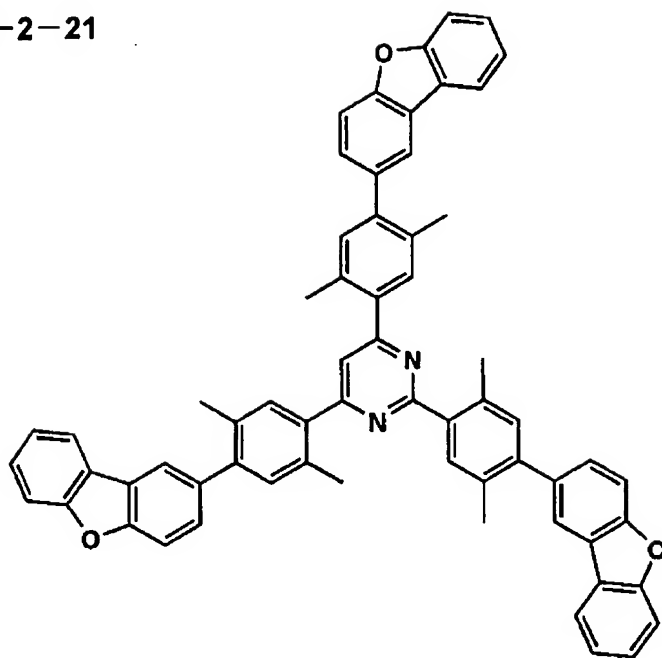
[Chemical formula 245]

**B5-2-19****B5-2-20**

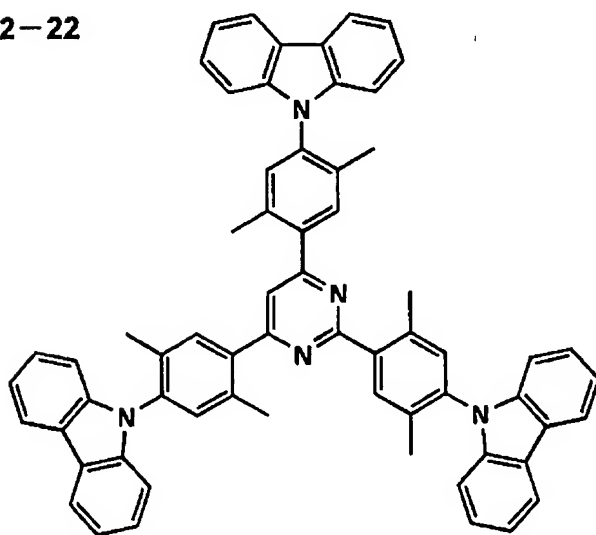
[0265]

[Chemical formula 246]

**B5-2-21**

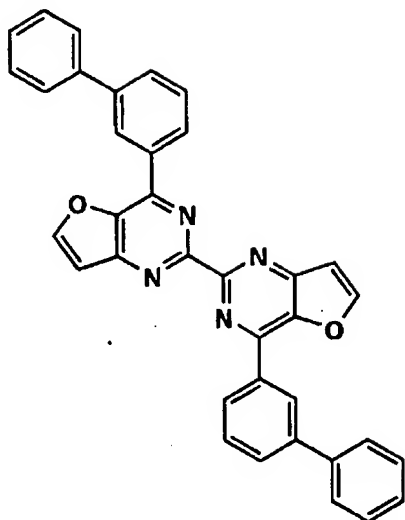
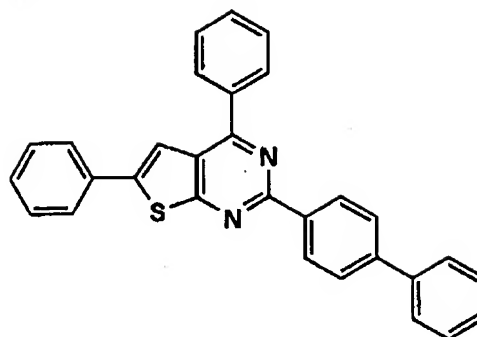
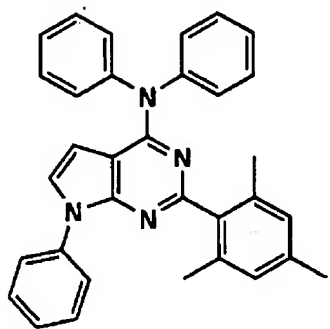
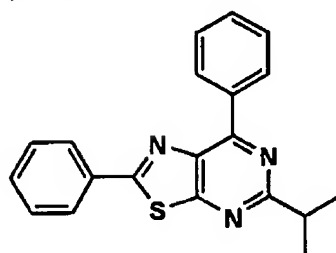
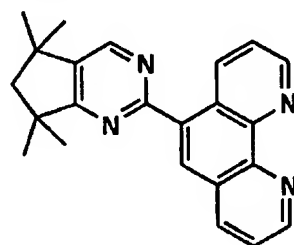
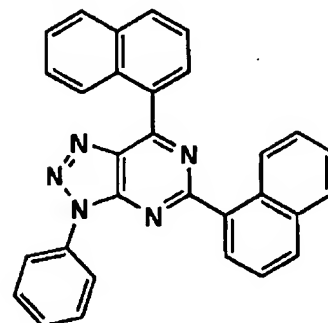


**B5-2-22**



[0266]

[Chemical formula 247]

**B5-3-1****B5-3-2****B5-3-3****B5-3-4****B5-3-5****B5-3-6**

[0267]As for the molecular weight of these compounds, it is preferred that it is 600-2000. Tg (glass transition temperature) goes up that molecular weights are 600-2000, heat stability improves, and an element life is improved. More desirable molecular weights are 800-2000.

[0268]Although these compounds can be manufactured by a publicly known method, the method indicated, for example to JP,2001-93670,A etc. can be used.

[0269]The compound denoted by said general formula (B6-1) is explained.

[0270] $Ar_1$ ,  $Ar_2$ , and  $Ar_3$  express 6 member aromatic series machine among a formula, and  $Ar_{11}$ ,  $Ar_{12}$ , and  $Ar_{13}$  express 6 member aromatic series machine or 5 member monocycle aromatic series machine. 6 member aromatic series machine denoted by  $Ar_1$ ,  $Ar_2$ ,  $Ar_3$ ,  $Ar_{11}$ ,  $Ar_{12}$ , and  $Ar_{13}$  may form a condensed ring further. concrete -- a hydrocarbon aromatic series machine (a phenyl group, a naphthyl group, and a phenanthrene machine.) Complex aromatic series machines (a pyridyl group, a pyrazinyl machine, a pyrimidinyl group, a PIRIDAJINIRU machine, a quinolyl machine, a thoriadinyl group, a cinchona bark ZOKINIRU machine, an acridinyl machine, etc.), such as an anthryl group, p-trill machine, and p-chlorophenyl machine, are expressed.

[0271]As a 5 member monocycle aromatic series machine denoted by  $Ar_{11}$ ,  $Ar_{12}$ , and  $Ar_{13}$ , a pyrrolyl machine, a thienyl group, a frill machine, an imidazolyl group, a pyrazolyl machine, an oxazolyl machine, a thiazolyl machine, etc. are mentioned.  $Ar_1$ ,  $Ar_2$ ,  $Ar_3$ ,  $Ar_{11}$ ,  $Ar_{12}$ , and  $Ar_{13}$  may have a substituent further.

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For subsequent translation(s), please click on the above "CONTINUE" button.

When continued, the current translation will be overwritten with the new translation.

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[Translation done.]

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[0272]The compound denoted by a general formula (B6-1) is preferred, and all of  $Ar_1$ ,  $Ar_2$ ,  $Ar_3$ ,  $Ar_{11}$ ,  $Ar_{12}$ , and  $Ar_{13}$  are monocycle aromatic series machines.

When  $Ar_1$ ,  $Ar_2$ , and  $Ar_3$  are hydrocarbon aromatic series machines preferably and  $Ar_{11}$ ,  $Ar_{12}$ , and  $Ar_{13}$  are 6 member complex aromatic series machines, it is a case where at least one of  $Ar_{11}$ ,  $Ar_{12}$ , and the  $Ar_{13}$  is a thienyl group.

[0273]The triazine derivative used for this invention is a case where it is expressed with a general formula (B6-2) still more preferably. In a general formula (B6-2),  $Ar_{21}$ ,  $Ar_{22}$ , and  $Ar_{23}$  express 6 member aromatic series machine or 5 member monocycle aromatic series machine, and  $R_1$ ,  $R_2$ , and  $R_3$  express the substituent of 1 value.  $l$ ,  $m$ , and  $n$  express the integer of 1-4, respectively. The thing same as 6 member aromatic series machine and a 5 member aromatic series machine as  $Ar_{11}$  in a general formula (B6-1),  $Ar_{12}$ , and  $Ar_{13}$  denoted by  $Ar_{21}$ ,  $Ar_{22}$ , and  $Ar_{23}$  is mentioned.

[0274][ as a substituent of the 1 value denoted by  $R_1$ ,  $R_2$ , and  $R_3$  ] an alkyl group (a methyl group, an ethyl group, i-propyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, aryl groups (a phenyl group and a naphthyl group.), such as a cyclohexyl group and a benzyl group alkenyl groups (a vinyl group.), such as p-trill machine and p-chlorophenyl machine alkynyl groups (ethynyl group etc.) and alkyloxy machines (a methoxy group.), such as a propenyl machine and a styryl machine Aryloxy groups, such as an ethoxy basis, i-propoxy group, and a butoxy machine (phenoxy group etc.), An alkylthio group (a methylthio group, an ethyl thio group, i-pro PIRUKIO machine, etc.), arylthio groups (phenylthio group etc.), an amino group, and an alkylamino group (a dimethylamino group.) arylamino machines (an ANIRINO machine.), such as a diethylamino machine and an ethyl methylamino machine halogen atoms (a fluorine atom,



a chlorine atom, and a bromine atom.), such as a diphenylamino machine A cyano group, a nitro group, heterocyclic machines, etc. (a pyrrole group, a pyrrolidyl machine, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, a benzoxazolyl machine, etc.), such as an iodine atom, are mentioned.

[0275]In a general formula (B6-2),  $R_1$ ,  $R_2$ , and  $R_3$  are alkyl groups preferably, and it is a time of l, m, and n being 2-4, and most preferably,  $R_1$ ,  $R_2$ , and  $R_3$  are methyl groups, and it is a time of l, m, and n being 4.

[0276]In a general formula (B6-2), at least one of  $Ar_{21}$ ,  $Ar_{22}$ , or  $Ar_{23}$  is a thienyl group preferably.

[0277]Although the example of a concrete compound is shown below, this invention is not limited to these.

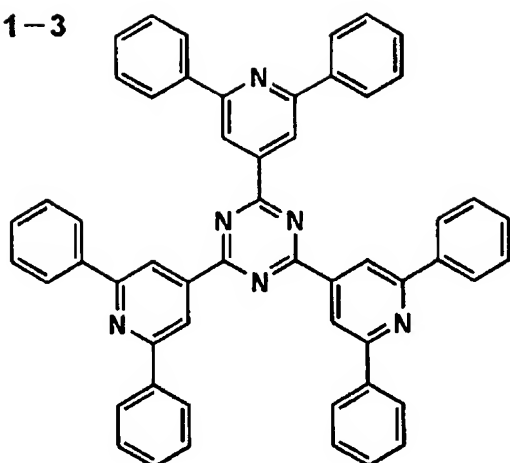
[0278]

[Chemical formula 248]

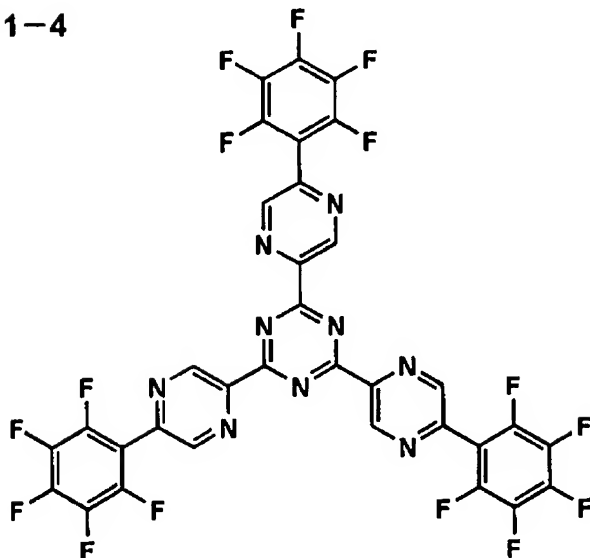


[Chemical formula 249]

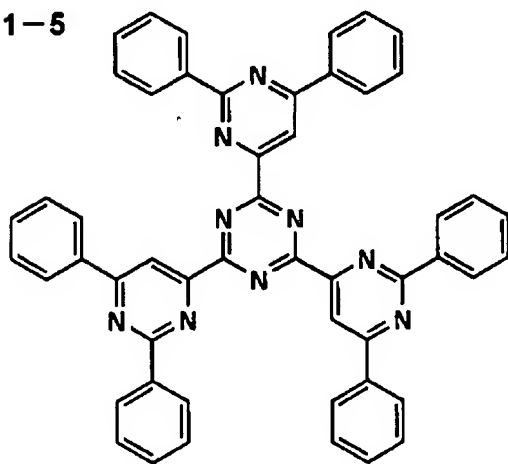
B6-1-3



B6-1-4

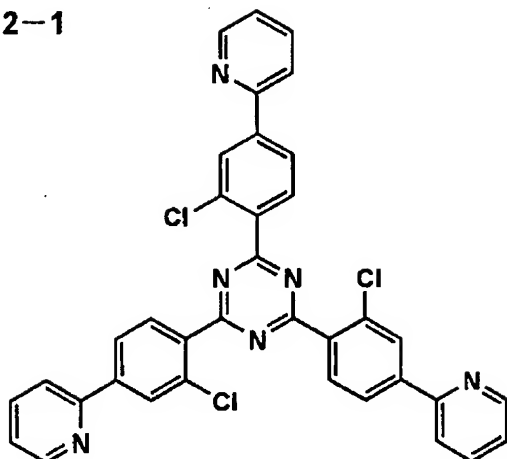
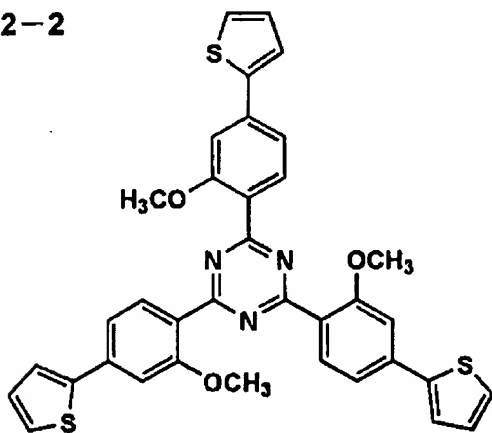


B6-1-5



[0280]

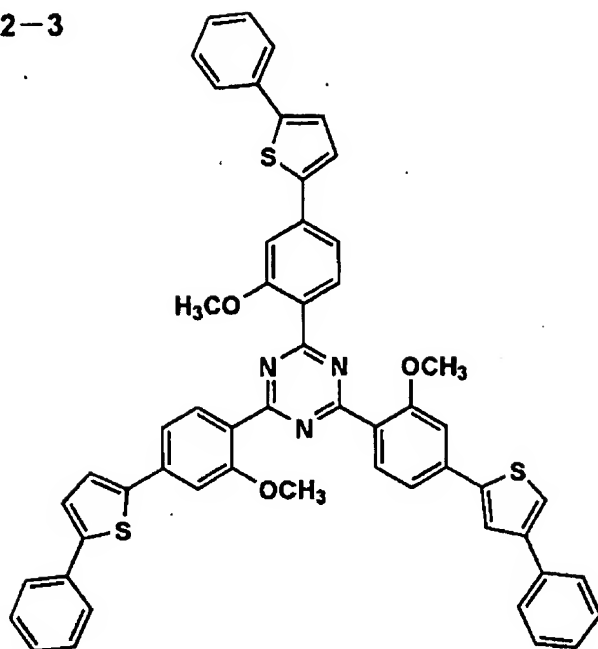
[Chemical formula 250]

**B6-2-1****B6-2-2**

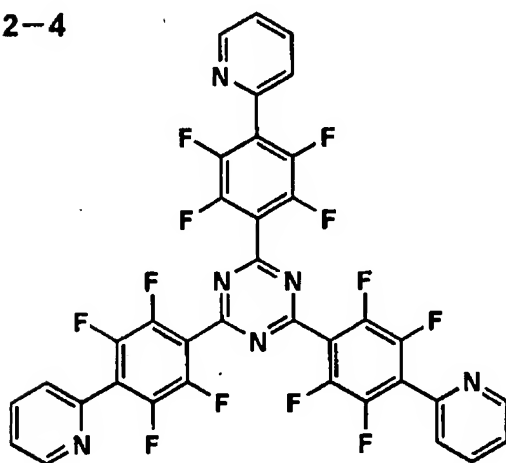
[0281]

[Chemical formula 251]

B6-2-3



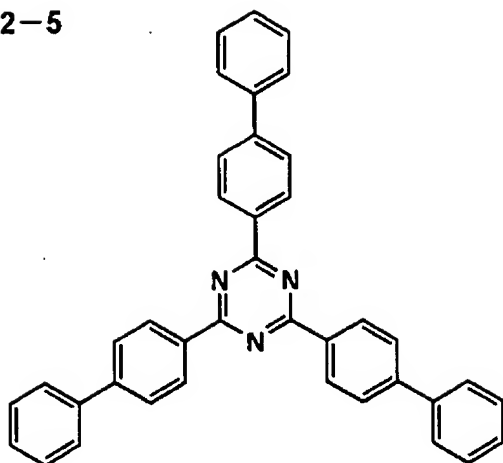
B6-2-4



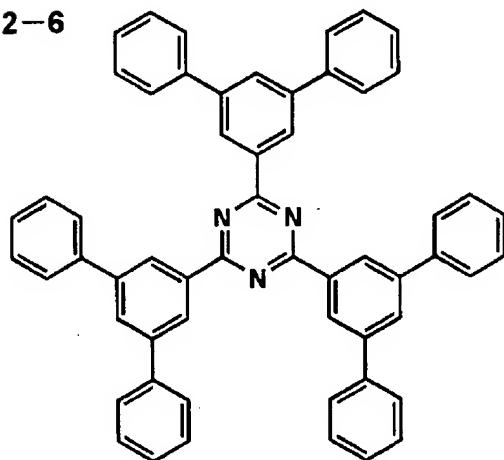
[0282]

[Chemical formula 252]

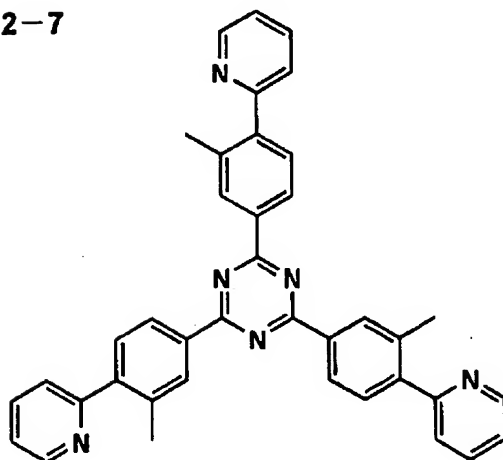
B6-2-5



B6-2-6



B6-2-7

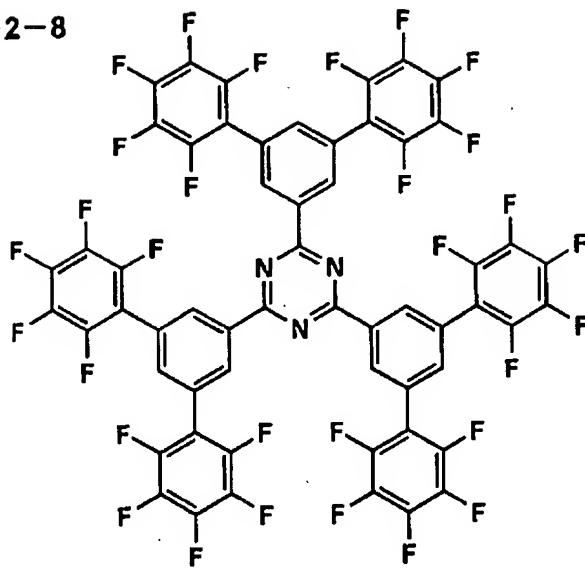


[0283]

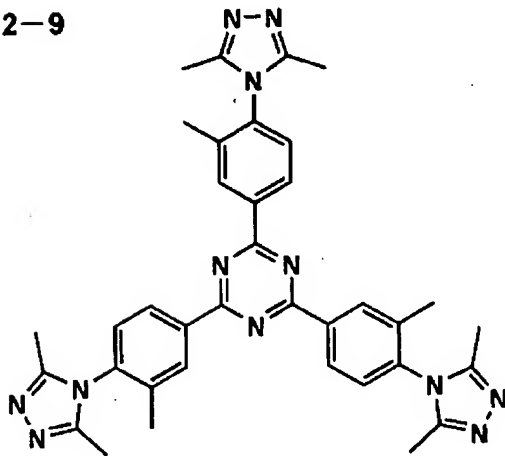


[Chemical formula 253]

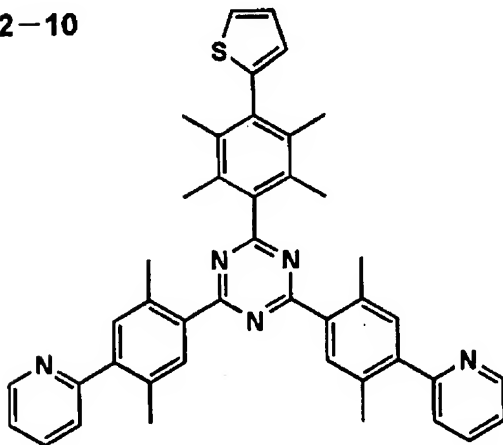
B6-2-8



B6-2-9



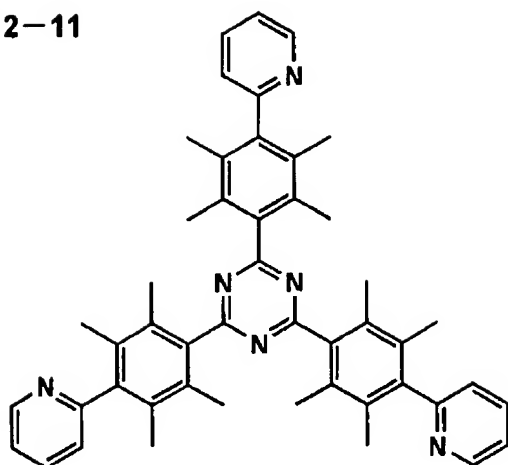
B6-2-10



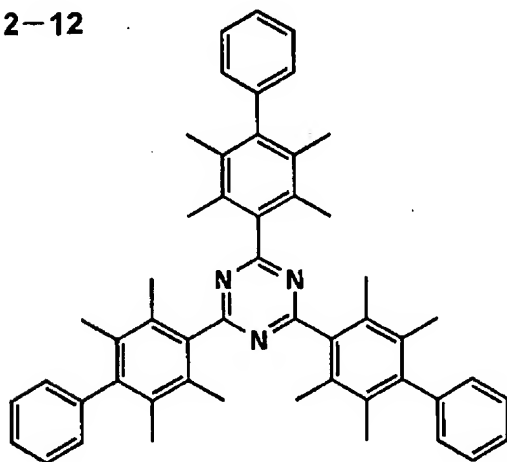
[0284]

[Chemical formula 254]

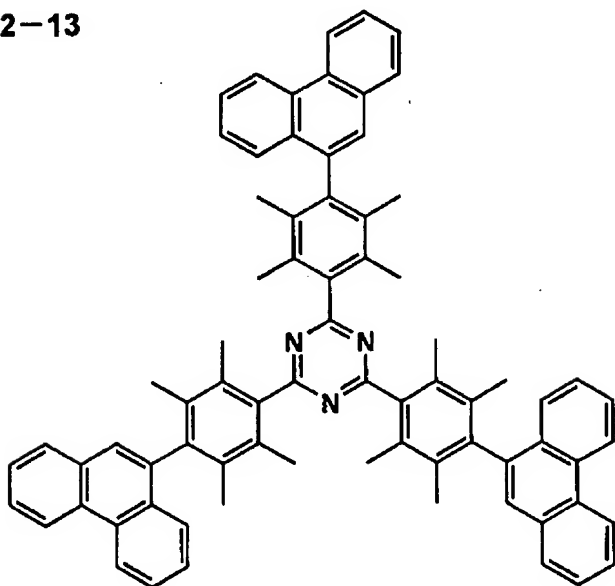
B6-2-11



B6-2-12

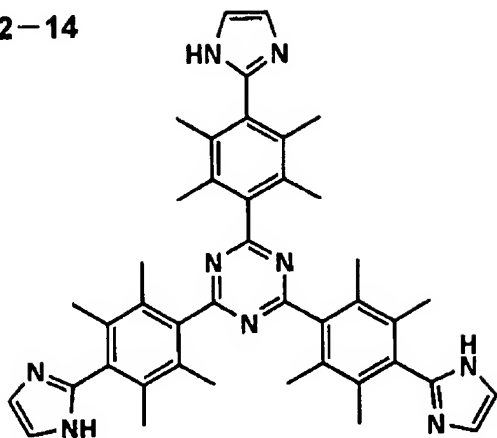
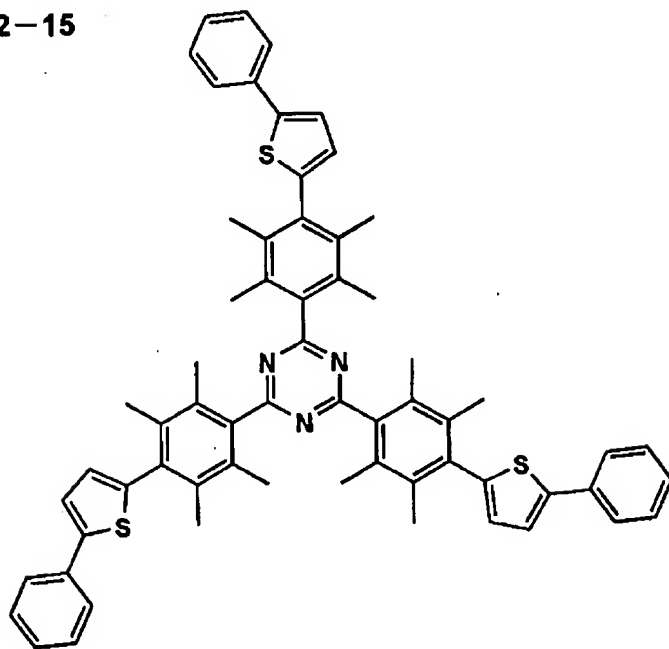


B6-2-13



[0285]

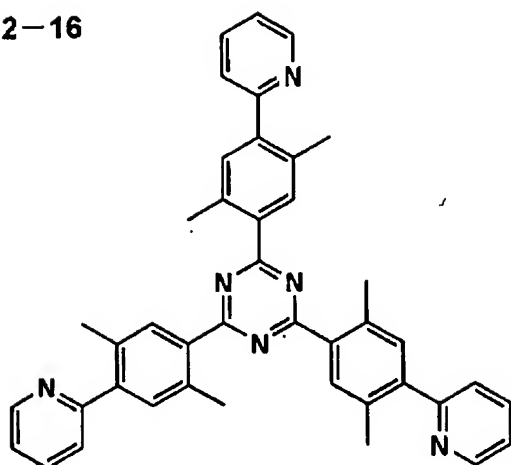
[Chemical formula 255]

**B6-2-14****B6-2-15**

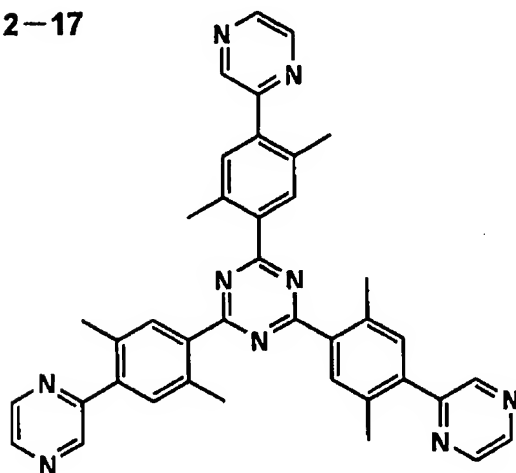
[0286]

[Chemical formula 256]

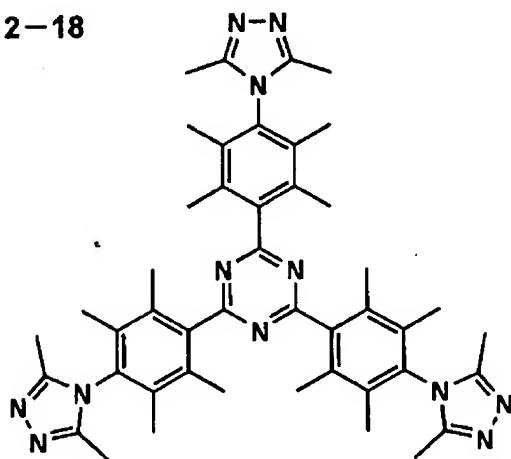
B6-2-16



B6-2-17



B6-2-18

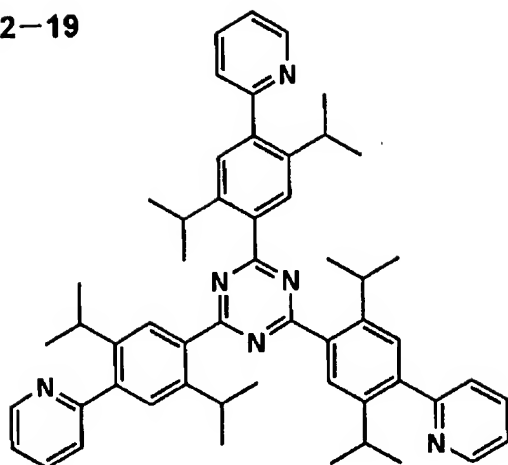


[0287]

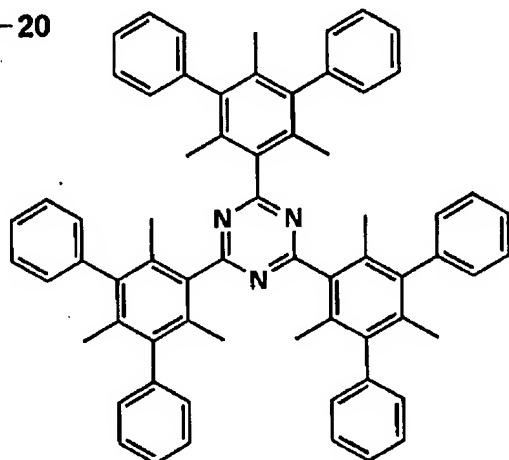
[Chemical formula 257]



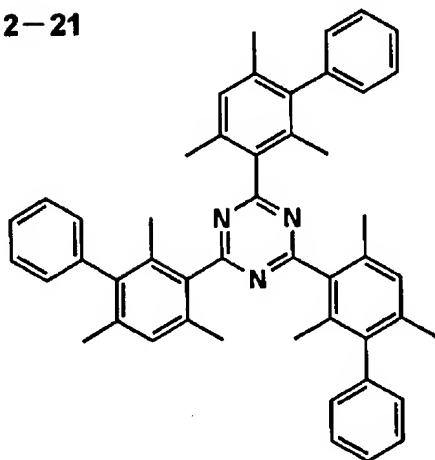
B6-2-19



B6-2-20

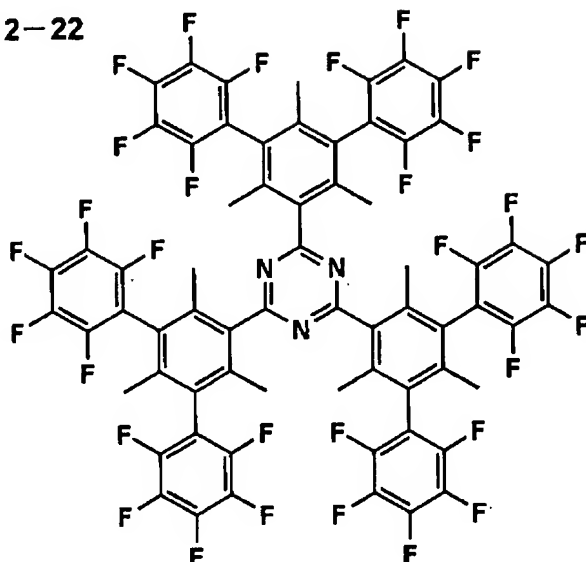
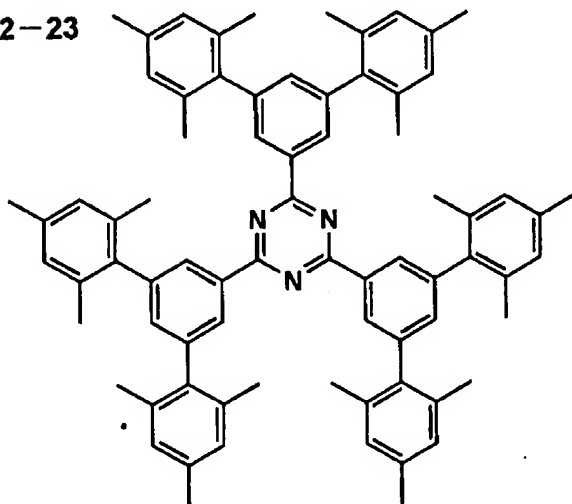


B6-2-21



[0288]

[Chemical formula 258]

**B6-2-22****B6-2-23**

[0289]As for the molecular weight of these compounds, it is preferred that it is 600-2000. Tg (glass transition temperature) goes up that molecular weights are 600-2000, heat stability

improves, and an element life is improved. More desirable molecular weights are 800-2000.

[0290]Although these compounds can be manufactured by a publicly known method, the method indicated, for example to JP,2001-93670,A etc. can be used.

[0291]Subsequently, the carbazole derivative compound concerning this invention is explained.

[0292]As a carbazole derivative compound concerning this invention, it is a carbazole derivative compound denoted by said general formula (B7-1).

[0293]The derivative compound denoted by a general formula (B7-1) is explained.

[0294]In a general formula (B7-1),  $R_1 - R_{11}$  express a hydrogen atom or a substituent, and at least one of  $R_1 - R_3$  has before long the partial structure denoted by said general formula (B7-2).

[0295][ in a general formula (B7-1) ] [ as a substituent denoted by  $R_1 - R_{11}$  ] an alkyl group (for example, a methyl group, an ethyl group, an iso-propyl group, and a hydroxyethyl machine.) Cycloalkyl machines, such as a trifluoromethyl group and a tert-butyl group. (For example, a cyclopentyl group, a cyclohexyl group, etc.), and aralkyl groups. (for example, a benzyl group) etc. and alkoxyalkyl groups (for example, a methoxymethyl machine.) Aryl groups, such as a methoxy ethyl group and ethoxymethyl machine and a propoxy ethyl group. (For example, a phenyl group, a naphthyl group, p-trill machine, p-chlorophenyl machine, etc.), an alkenyl group (for example, 2-propenyl machine, 3-butenyl group, and a 1-methyl 3-propenyl machine.) 3-pentenyl machine, a 1-methyl 3-butenyl group, a 4-hexenyl machine, Alkynyl groups, such as a vinyl group and a styryl machine (an ethynyl group, a propargyl machine, etc.), an alkoxyl group (for example, a methoxy group, an ethoxy basis, and an iso-propoxy group.) Aryloxy groups (for example, a phenoxy group, a naphthyloxy machine, etc.), such as a butoxy machine, alkylthio groups (for example, a methylthio group, an ethyl thio group, an

iso-pro PIRUKIO machine, etc.), an arylthio group (a phenylthio group, the Naff Chill thio group, etc.), an amino group and an alkylamino group (for example, a dimethylamino group and a diethylamino machine.) Arylamino machines, such as an ethyl methylamino machine (an ANIRINO machine, a diphenylamino machine, etc.), A halogen atom (a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc.), a cyano group, a nitro group, and a heterocyclic machine (for example, a pyridyl group and a thiazolyl machine.) An oxazolyl machine, an imidazolyl group, a frill machine, a pyrrolyl machine, a pyrazinyl machine, A pyrimidinyl group, a PIRIDAJINIRU machine, a selenazolyl machine, the Sour Hora Nils machine, A piperidinyl machine, a pyrazolyl machine, a tetrazolyl group, a pyrrolidyl machine, a benzimidazolyl machine, Silyl groups (for example, a trimethylsilyl machine, a tert-butyl dimethylsilyl group, a dimethylphenyl silyl group, a bird phenyl silyl group, etc.), such as a benzothiazolyl machine and a benzoxazolyl machine, etc. are mentioned.

[0296]The above-mentioned substituent may have a substituent further further.

[0297]In a general formula (B7-2), although an atomic group required for  $Z_1$  and  $Z_2$  to form an aromatic ring (an aromatic carbon ring, an aromatic heterocycle) respectively,  $R_{21} - R_{23}$  express a hydrogen atom or a substituent respectively, at least one expresses a substituent and n expresses 0 or 1.

[0298]As an example of the aromatic ring formed by  $Z_1$  and  $Z_2$ , a benzene ring, a NAFUTAREN ring, a phenan Indanthrene ring, a pyridine ring, a pyrimidine ring, a pyrazine ring, a quinoline ring, etc. are mentioned, and it is a time of  $Z_1$  and  $Z_2$  being benzene rings preferably [ both ]. As a substituent denoted by  $R_{21} - R_{23}$ , it is synonymous with the substituent denoted by  $R_1 - R_{11}$  in the above-mentioned general formula (B7-1).

[0299]In a general formula (B7-1), it is a time of at least one of the substituents preferably denoted by  $R_1 - R_3$  having a carbazole skeleton (it is also called a carbazole mother nucleus) as a partial structure. It is a time of at least one of  $R_{21} - R_{24}$  being an alkyl group preferably in a general formula (B7-2), When n is 0 more preferably and  $R_{23}$  and  $R_{24}$  are substituents,

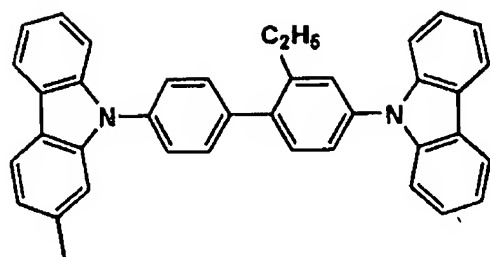
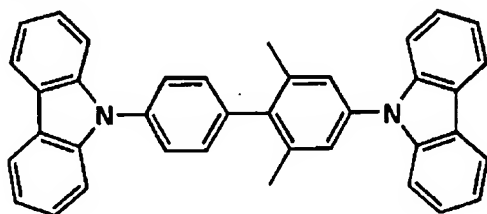
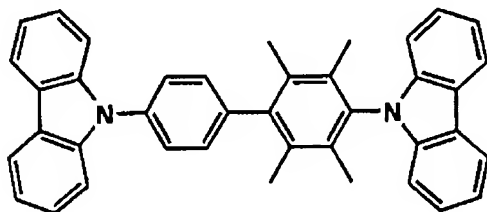
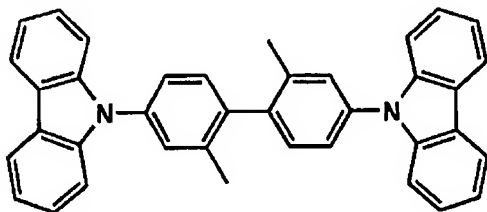
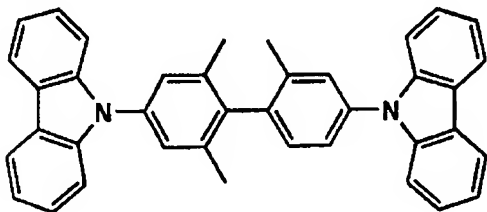
the time of n being 1 and all of  $R_{21} - R_{24}$  being substituents is the most preferred.

[0300]The substituent denoted by the substituent,  $R_{21} - R_{24}$  which are denoted by  $R_{23}$  and  $R_{24}$  here is synonymous with the substituent denoted by  $R_1 - R_{11}$  in the above-mentioned general formula (B7-1).

[0301]Although the concrete target of the compound denoted by a general formula (B7-1) below is shown, this invention is not limited to these.

[0302]

[Chemical formula 259]

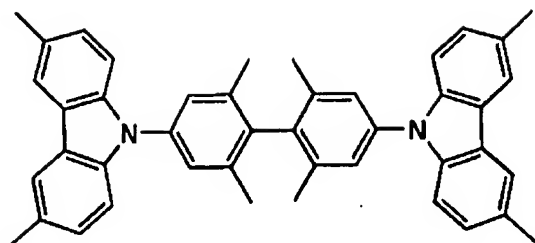
**B7-1****B7-2****B7-3****B7-4****B7-5**

[0303]

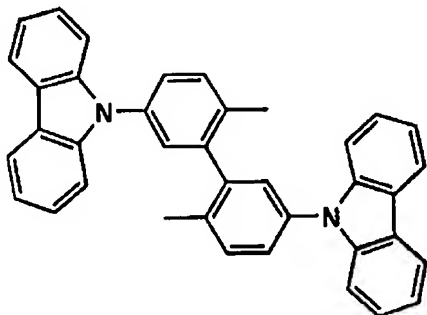
[Chemical formula 260]



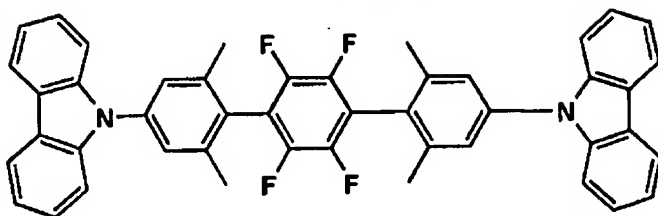
B7-6



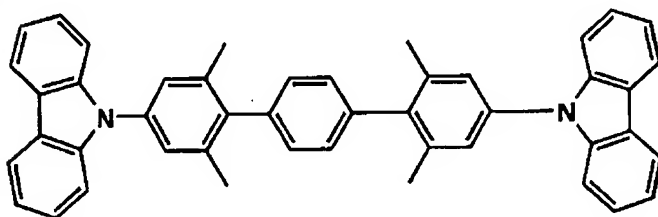
B7-7



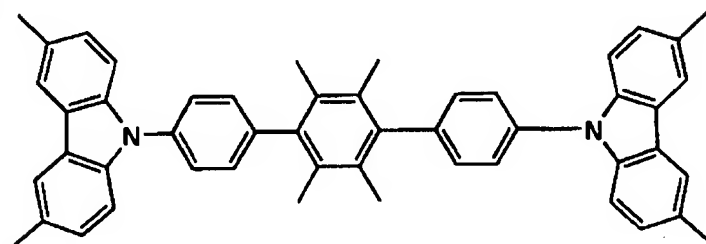
B7-8



B7-9

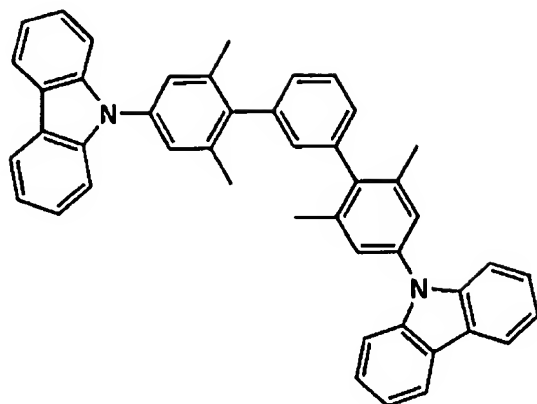
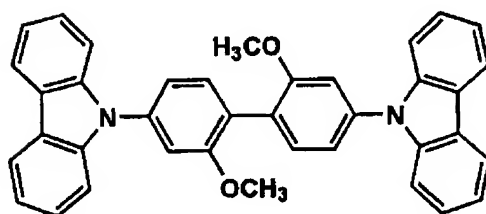
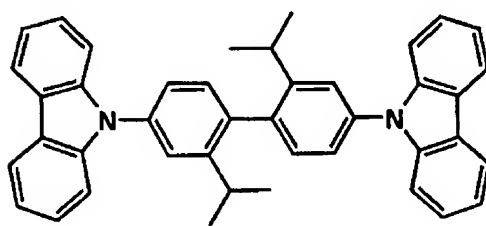
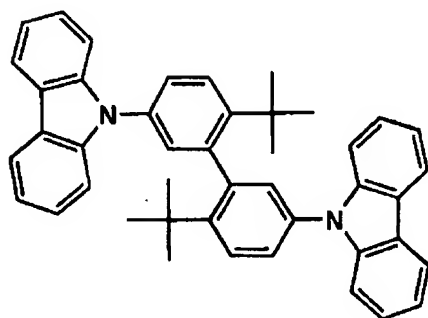


B7-10



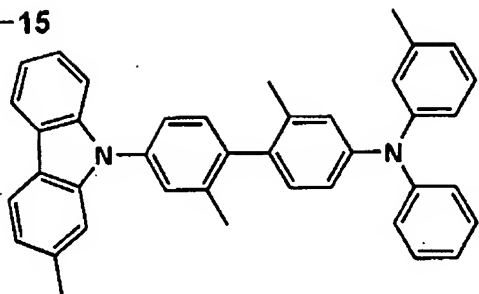
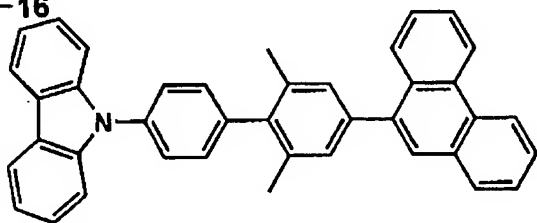
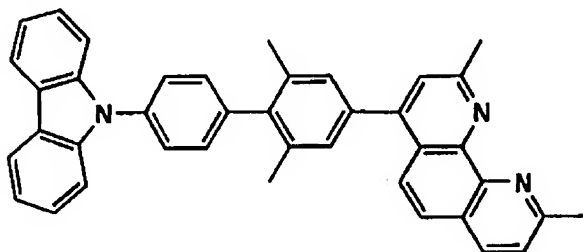
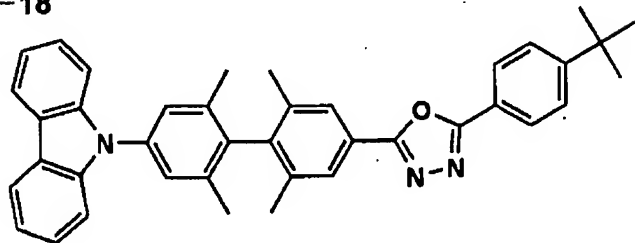
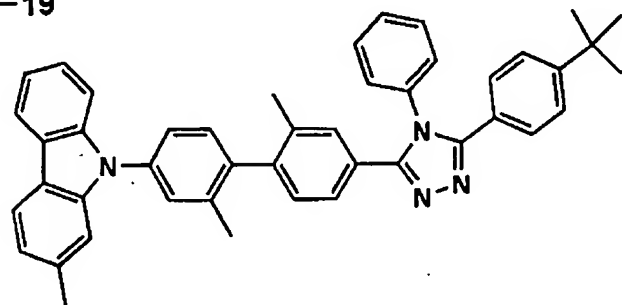
[0304]

[Chemical formula 261]

**B7-11****B7-12****B7-13****B7-14**

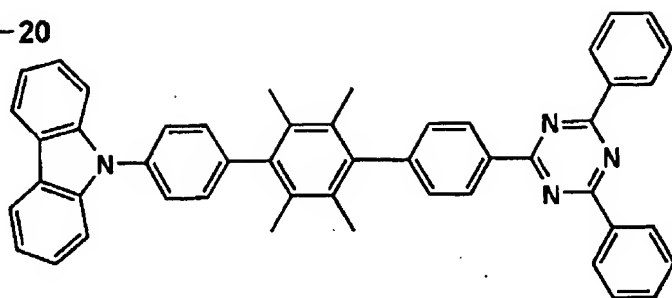
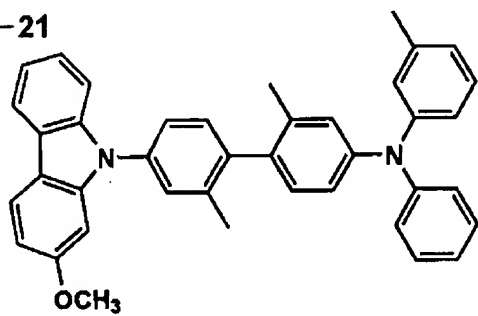
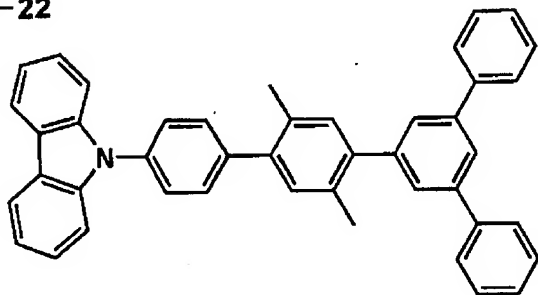
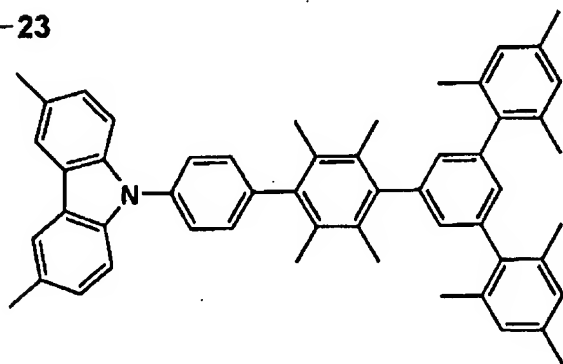
[0305]

[Chemical formula 262]

**B7-15****B7-16****B7-17****B7-18****B7-19**

[0306]

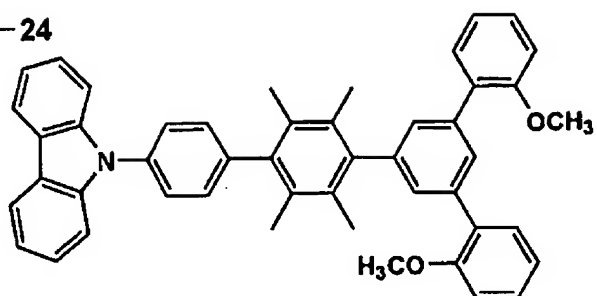
[Chemical formula 263]

**B7-20****B7-21****B7-22****B7-23**

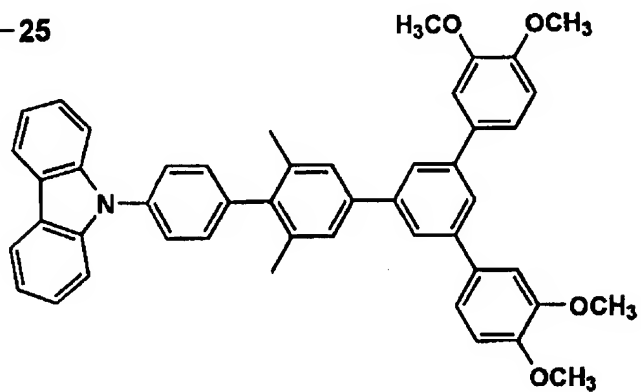
[0307]

[Chemical formula 264]

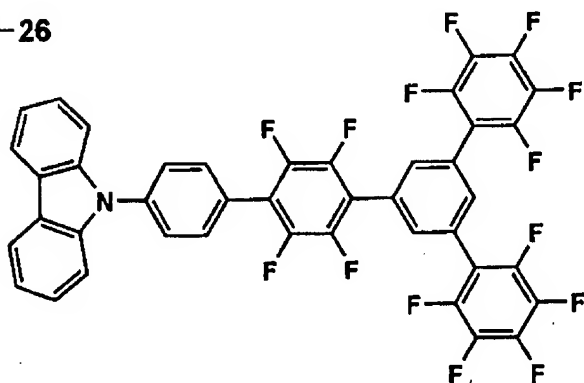
B7-24



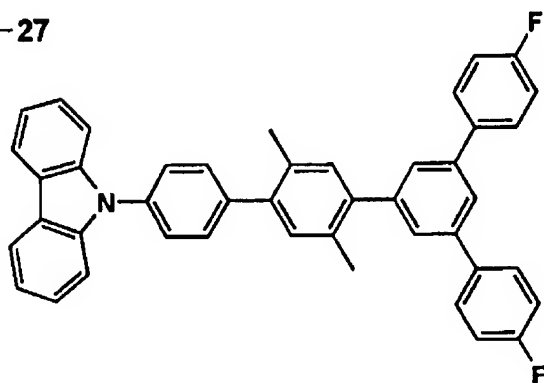
B7-25



B7-26



B7-27

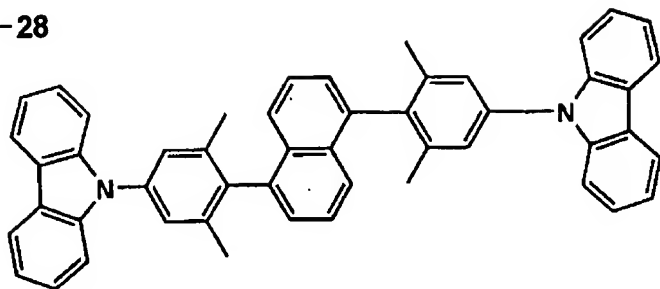




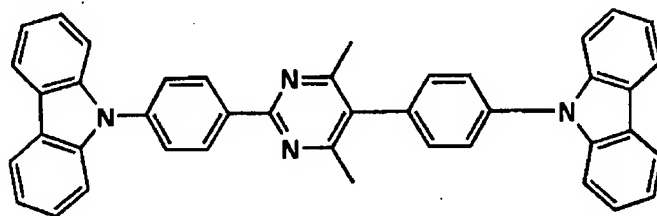
[0308]

[Chemical formula 265]

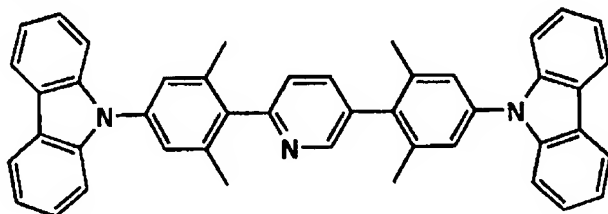
**B7-28**



**B7-29**



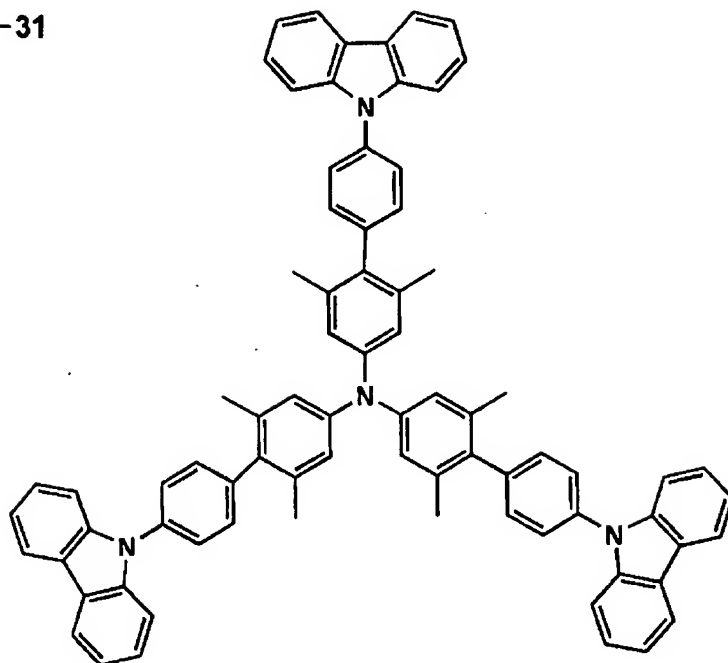
**B7-30**



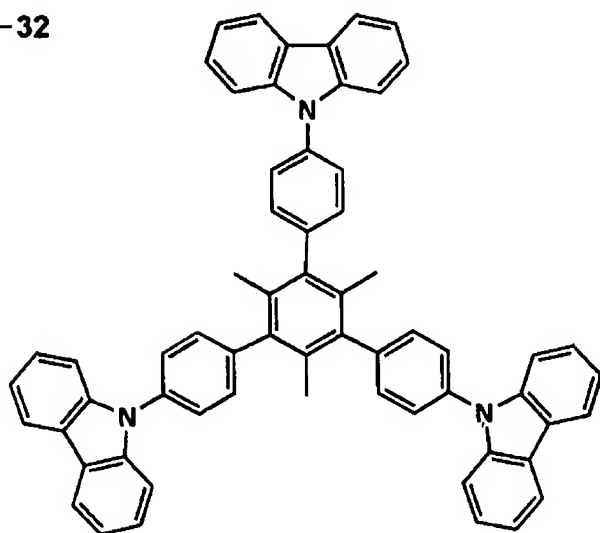
[0309]

[Chemical formula 266]

**B7-31**



**B7-32**



[0310]The heat stability of the organic electroluminescence element of this invention is raised, And it is desirable still more preferred that it is the range of 600-2000, and the ranges of the molecular weight of a carbazole derivative compound denoted by a general formula (B7-1) from a viewpoint of element life extension are 800-2000.

[0311]The carbazole derivative compound denoted by the general formula (B7-1) concerning this invention is JP,2000-21572,A, for example, although it can manufacture by a publicly known method.

With reference to the method indicated to \*\*, it is compoundable.

[0312]Hereafter, the carbazole derivative denoted by a general formula (B8-1) is explained.

[0313]In a general formula (B8-1),  $R_1 - R_{13}$  express the substituent of a hydrogen atom or 1 value, and at least one of  $R_1 - R_8$  has before long the structure shown in a general formula (B8-1-1). [ as a substituent of the 1 value denoted by  $R_1 - R_{13}$  ] an alkyl group (a methyl group, an ethyl group, i-propyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, aryl groups (a phenyl group and a naphthyl group.), such as a cyclohexyl group and a benzyl group alkenyl groups (a vinyl group.), such as p-trill machine and p-chlorophenyl machine alkynyl groups (ethynyl group etc.) and alkyloxy machines (a methoxy group.), such as a propenyl machine and a styryl machine Aryloxy groups, such as an ethoxy basis, i-propoxy group, and a butoxy machine (phenoxy group etc.), An alkylthio group (a methylthio group, an ethyl thio group, i-pro PIRUKIO machine, etc.), arylthio groups (phenylthio group etc.), an amino group, and an alkylamino group (a dimethylamino group.) arylamino machines (an ANIRINO machine.), such as a diethylamino machine and an ethyl methylamino machine halogen atoms (a fluorine atom, a chlorine atom, and a bromine atom.), such as a diphenylamino machine A cyano group, a nitro group, heterocyclic machines (a pyrrole group, a pyrrolidyl machine, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, a benzoxazolyl machine, etc.), such as an iodine atom, Silyl groups (a trimethylsilyl machine, t-butyl dimethylsilyl group, a dimethylphenyl silyl group, a bird phenyl silyl group, etc.) etc. are mentioned. Each substituent may have a substituent further. Substituents may join together

and a ring may be formed.

[0314]When an atomic group required for  $Z_1$  and  $Z_2$  to form a ring,  $R_{21}$  -  $R_{24}$  express the substituent of a hydrogen atom or 1 value in a general formula (B8-1-1),  $n$  expresses 0 or 1 and  $n$  is 0, At least one of  $R_{23}$  and the  $R_{24}$  expresses the substituent of 1 value, and when  $n$  is 1, at least one of  $R_{21}$  - the  $R_{24}$  expresses the substituent of 1 value. The same thing as the substituent of the 1 value denoted by  $R_1$  -  $R_{13}$  as a substituent of the 1 value denoted by  $R_{21}$  -  $R_{24}$  is mentioned.

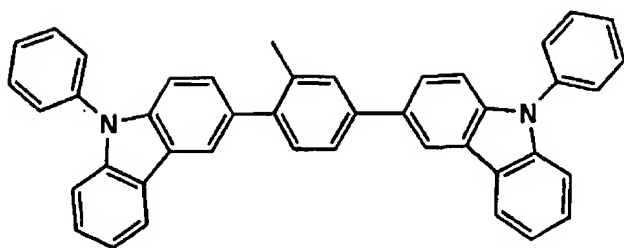
[0315]In a general formula (B8-1), it is a time of at least one of the substituents of the 1 value preferably denoted by  $R_1$  -  $R_8$  having a carbazole skeleton. In a general formula (B8-1-1), preferably, When it is a time of at least one of  $R_{21}$  - the  $R_{24}$  being an alkyl group,  $n$  is 0 more preferably and  $R_{23}$  and  $R_{24}$  are the substituents of 1 value, Or it is a time of  $n$  being 1 and at least two of  $R_{21}$  -  $R_{24}$  being the substituents of 1 value, and the time of  $n$  being 1 and all of  $R_{21}$  -  $R_{24}$  being the substituents of 1 value is the most preferred.

[0316]Although the example of a concrete compound is shown below, the compound in this invention is not limited to these.

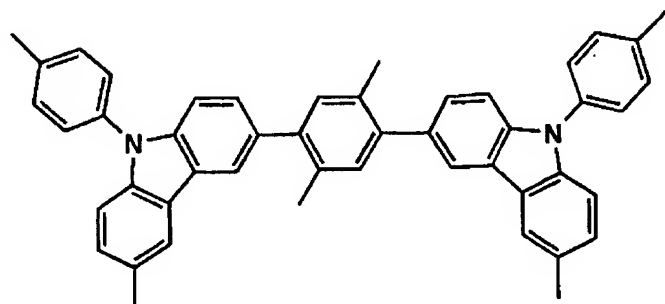
[0317]

[Chemical formula 267]

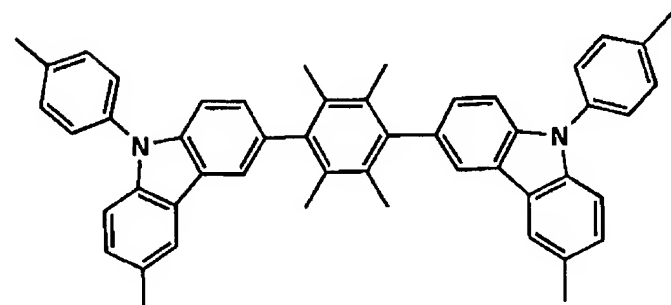
B8-1



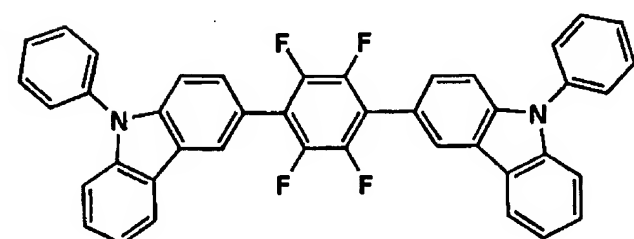
B8-2



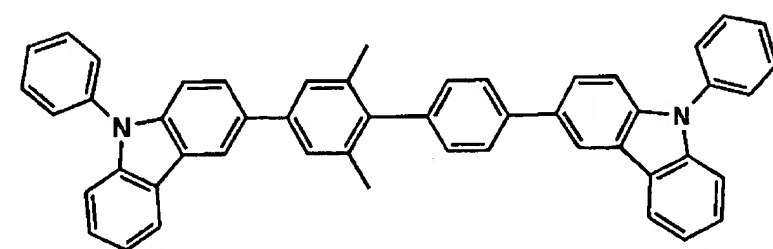
B8-3



B8-4



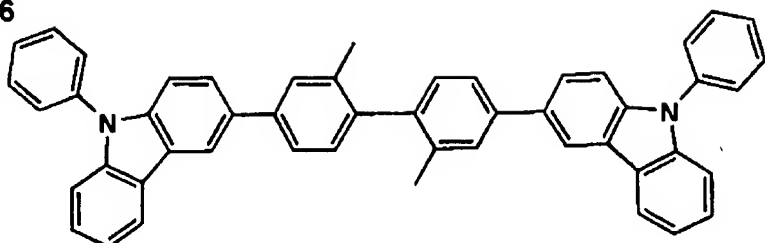
B8-5



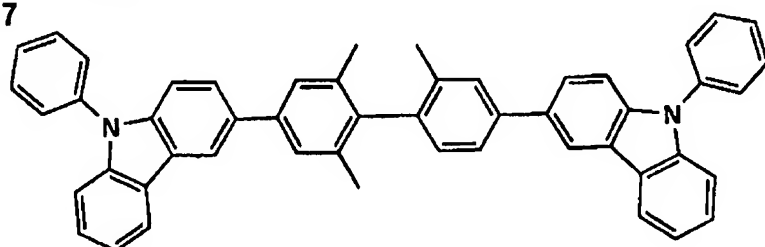
[0318]

[Chemical formula 268]

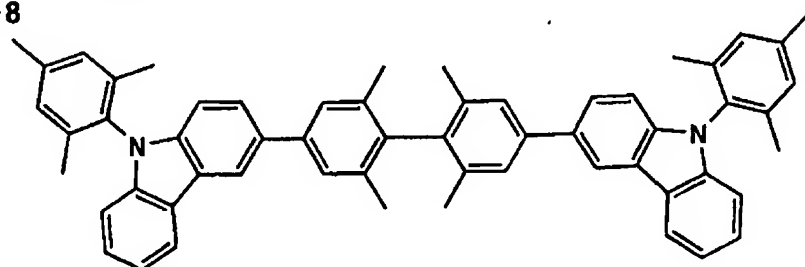
B8-6



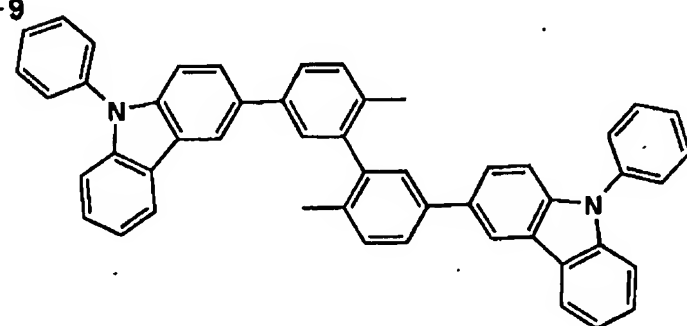
B8-7



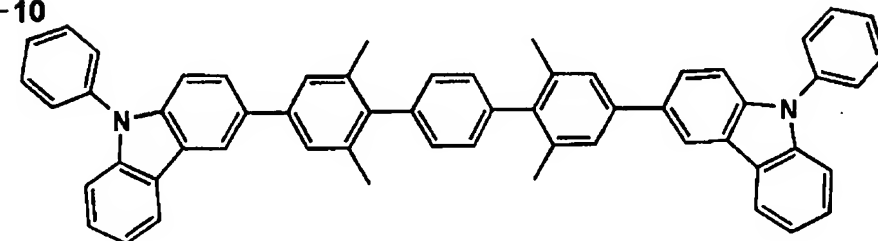
B8-8



B8-9



B8-10

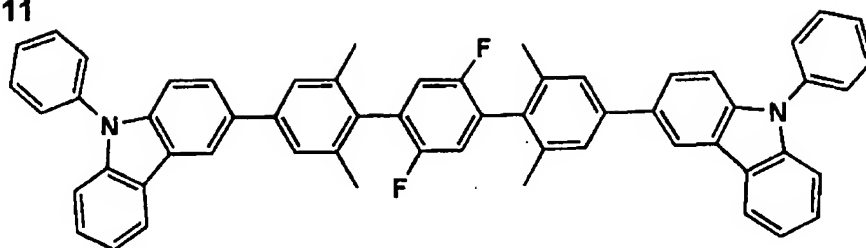


[0319]

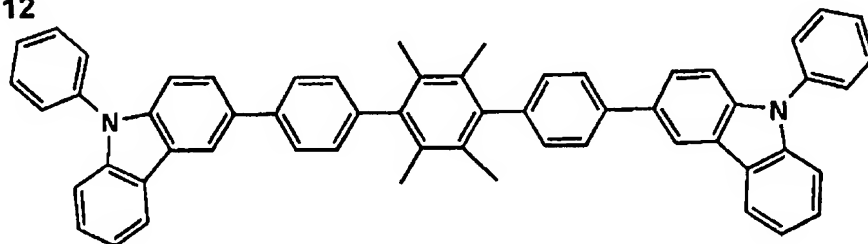
[Chemical formula 269]



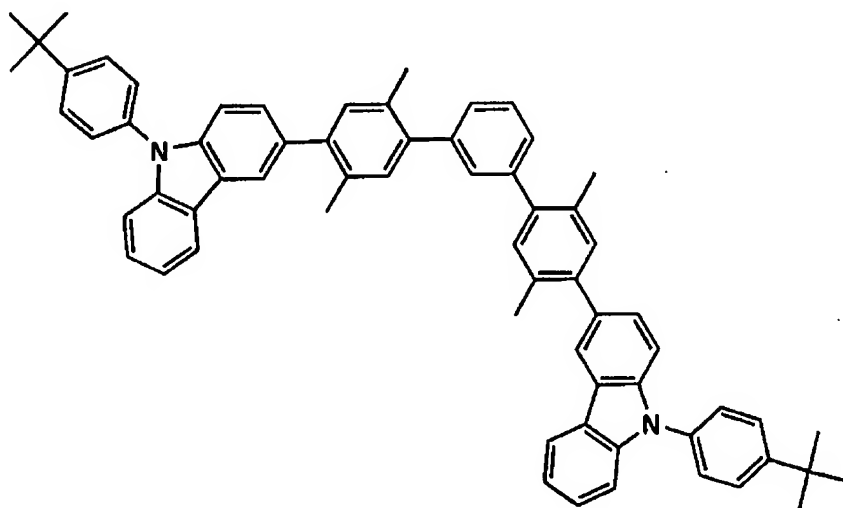
B8-11



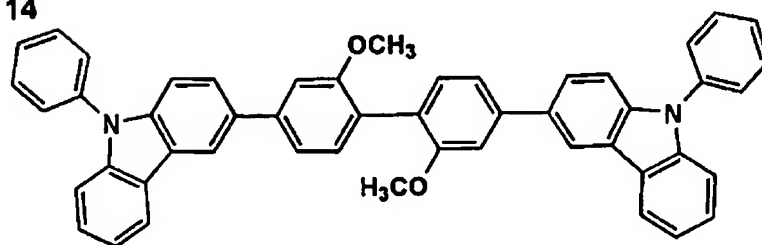
B8-12



B8-13



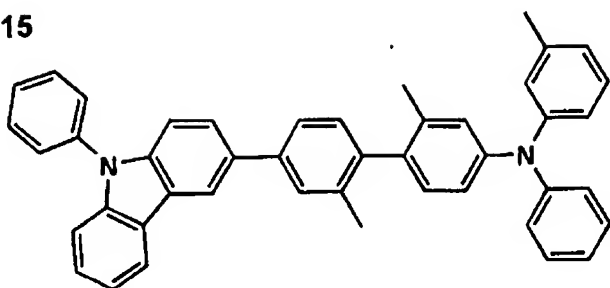
B8-14



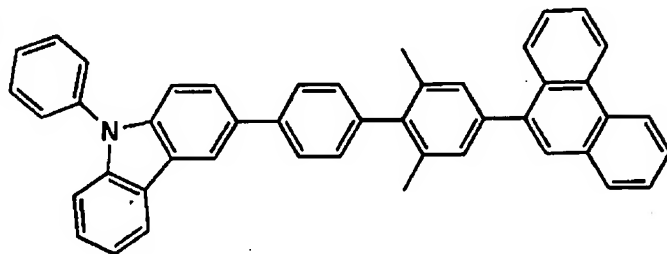
[0320]

[Chemical formula 270]

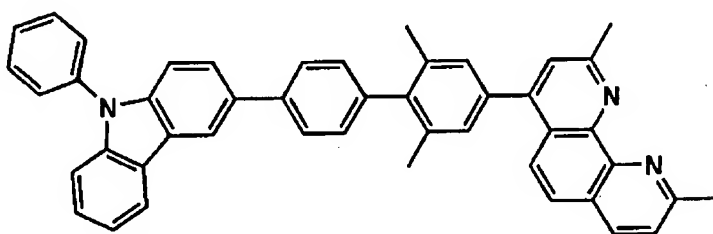
B8-15



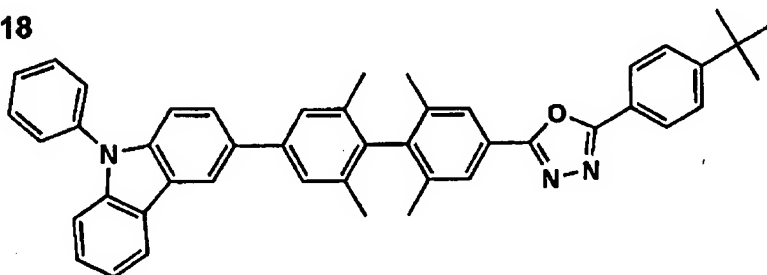
B8-16



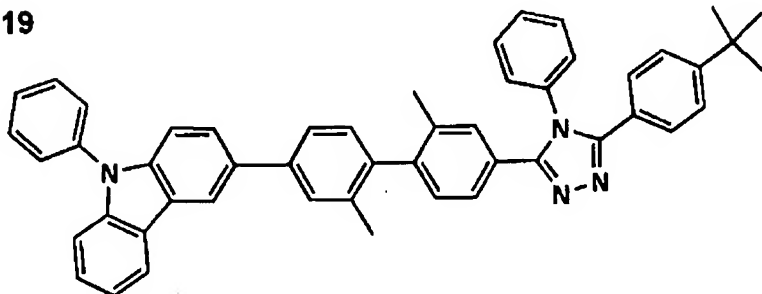
B8-17



B8-18



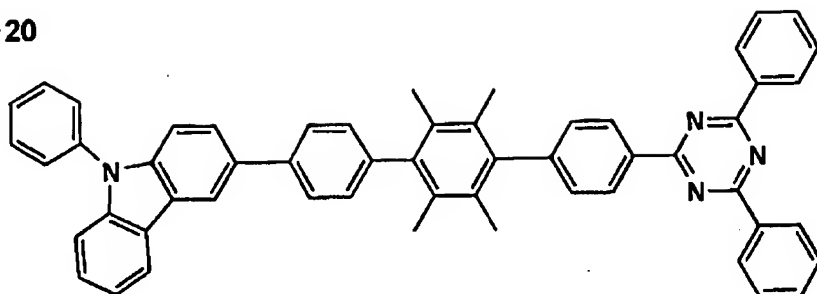
B8-19



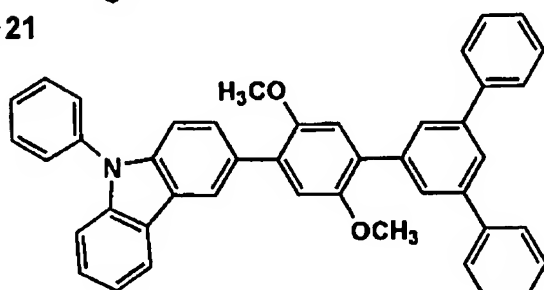
[0321]

[Chemical formula 271]

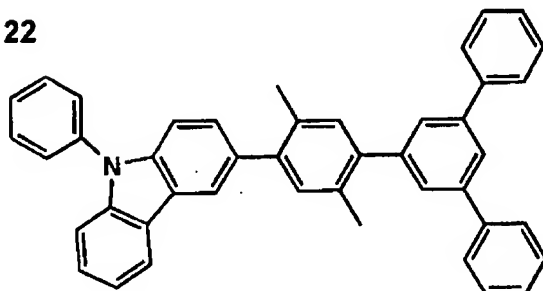
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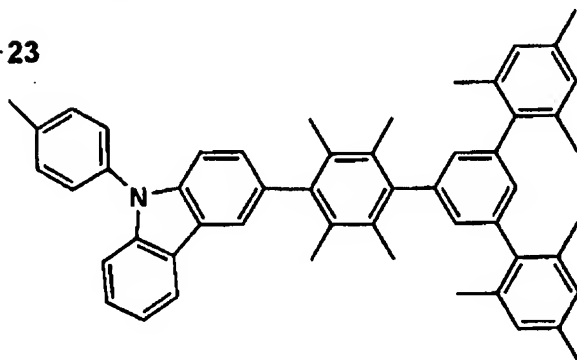
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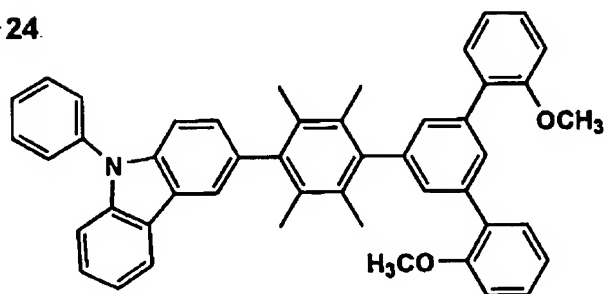
B8-22



B8-23



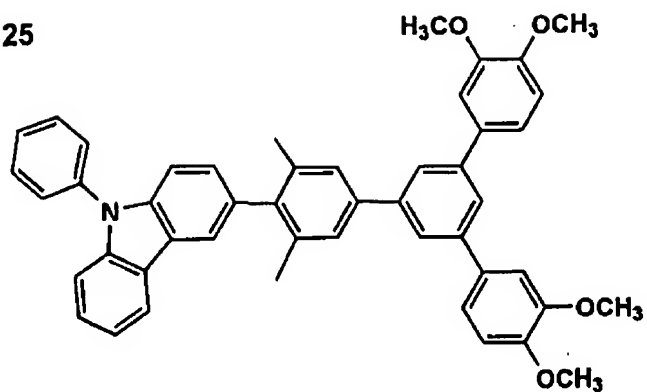
B8-24



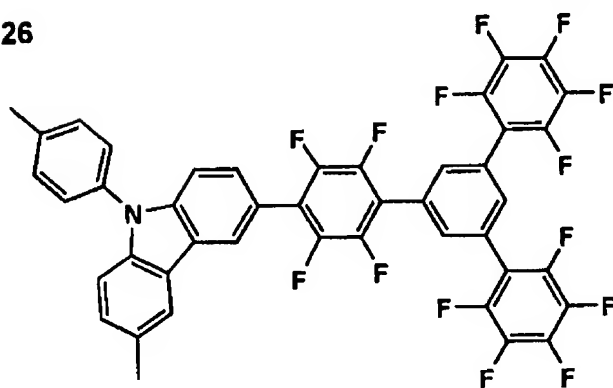
[0322]

[Chemical formula 272]

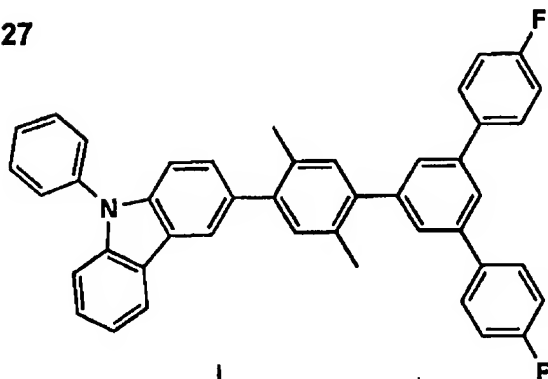
B8-25



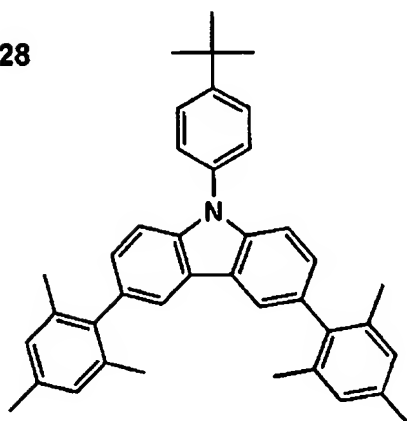
B8-26



B8-27



B8-28

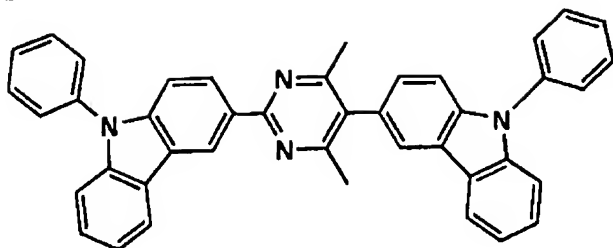


[0323]

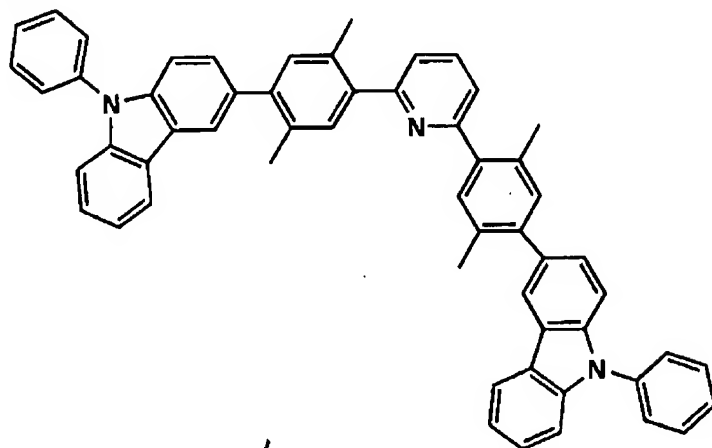
[Chemical formula 273]



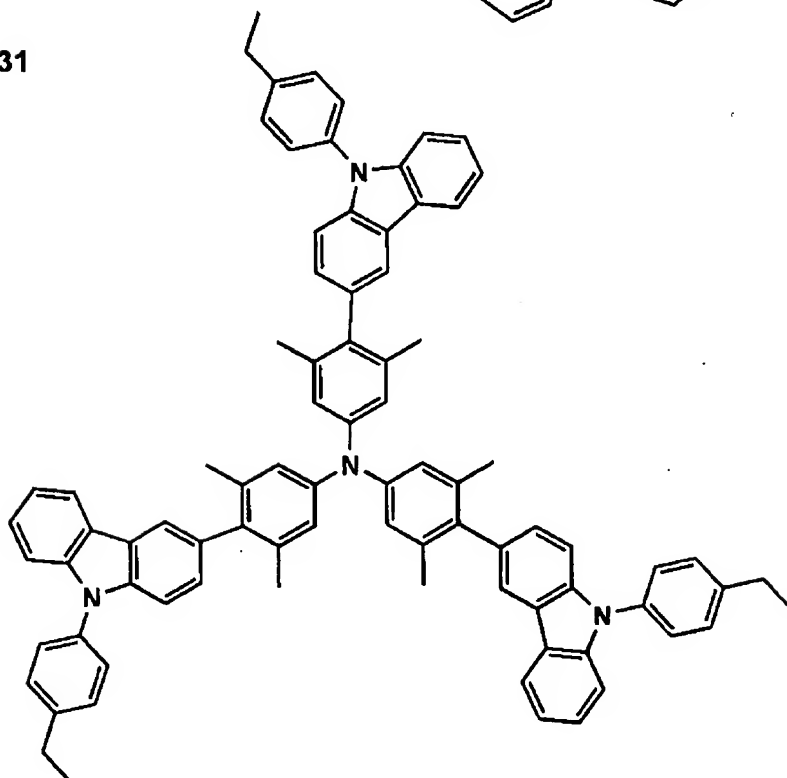
B8-29



B8-30

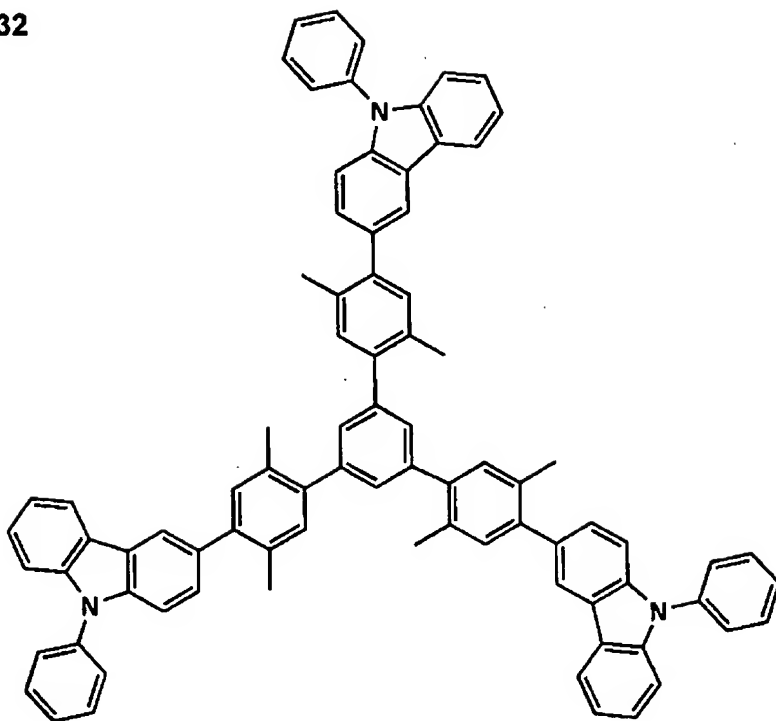
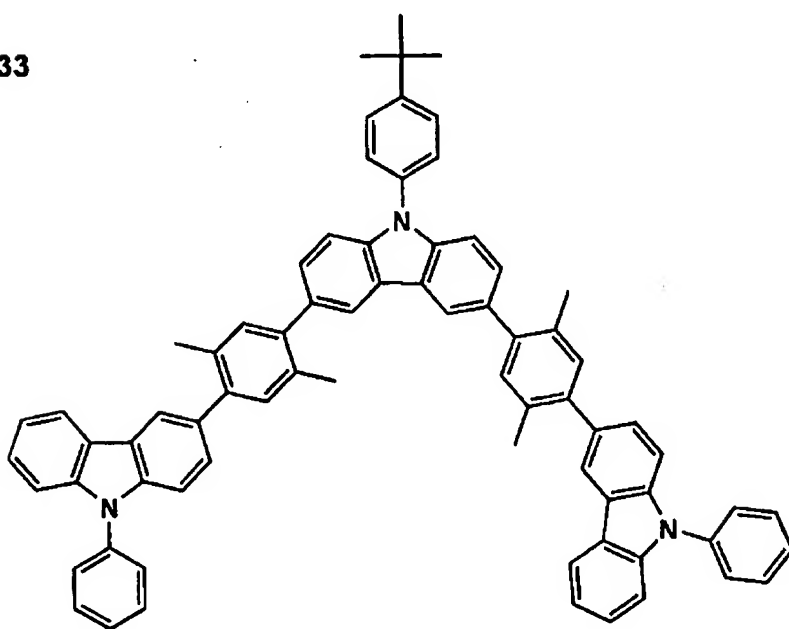


B8-31



[0324]

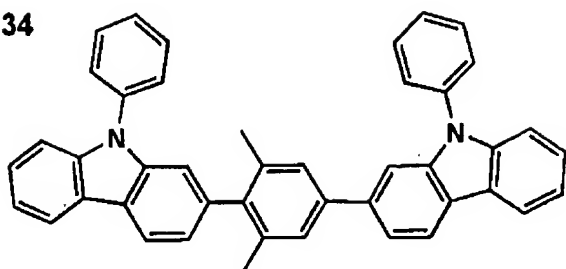
[Chemical formula 274]

**B8-32****B8-33**

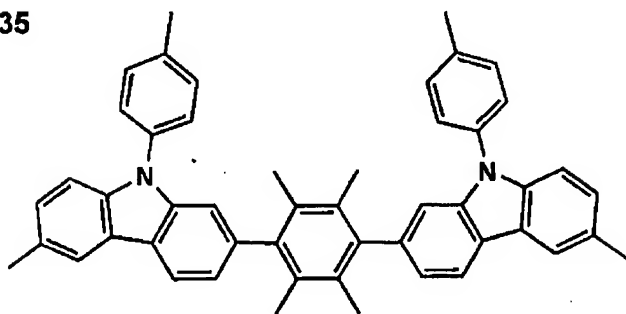
[0325]

[Chemical formula 275]

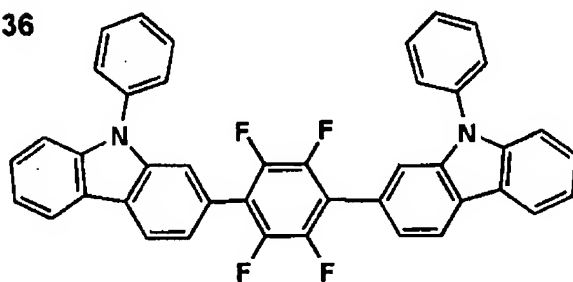
B8-34



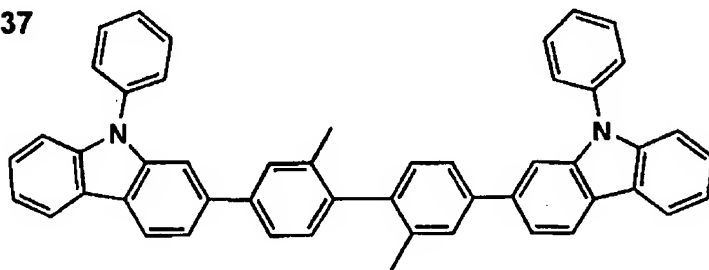
B8-35



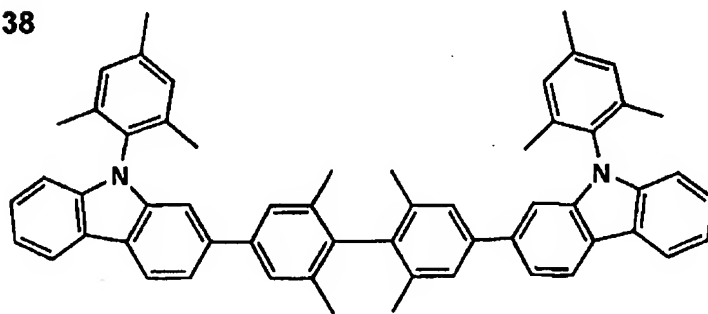
B8-36



B8-37

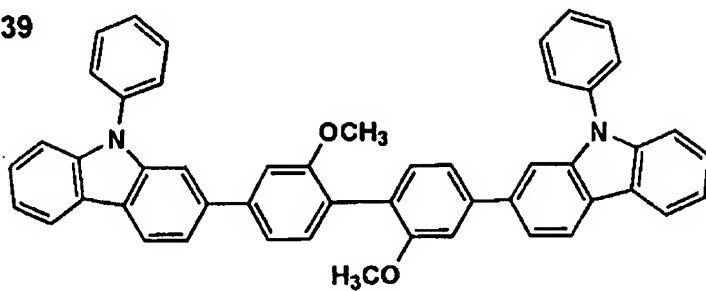
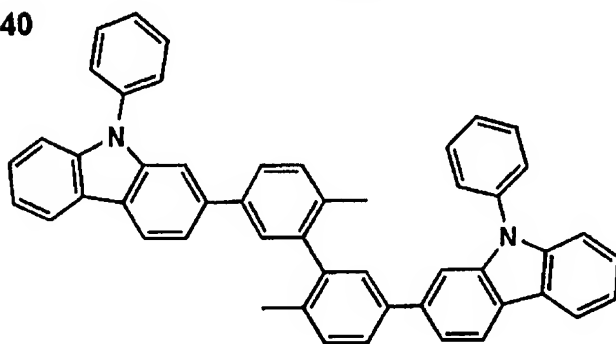
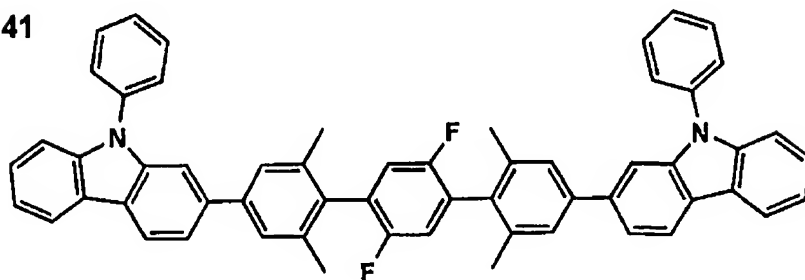
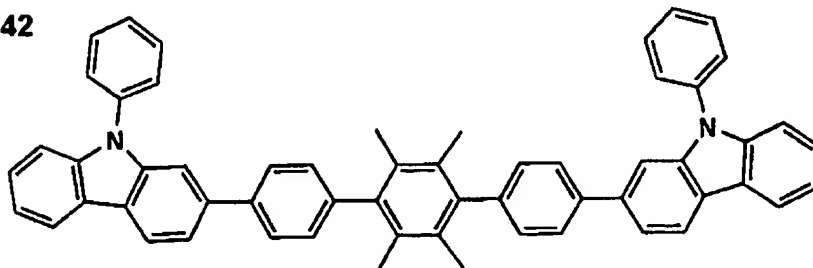


B8-38



[0326]

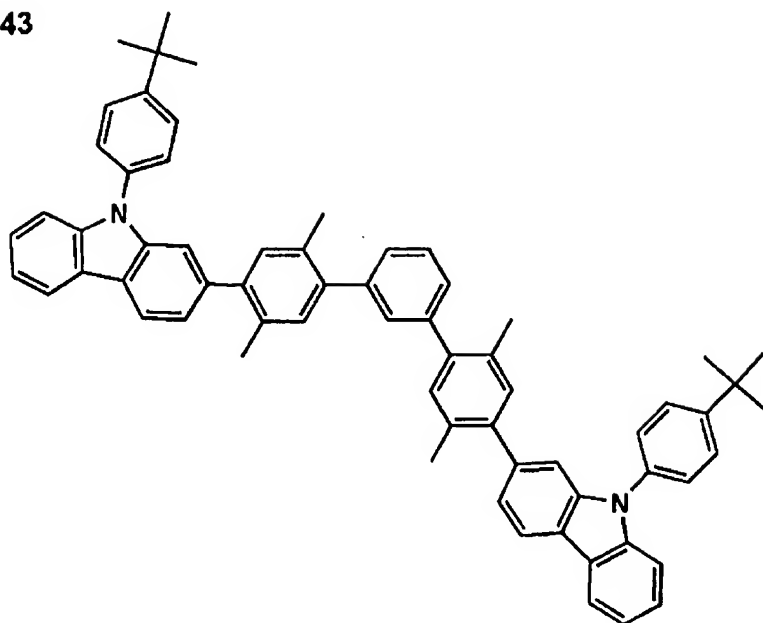
[Chemical formula 276]

**B8-39****B8-40****B8-41****B8-42**

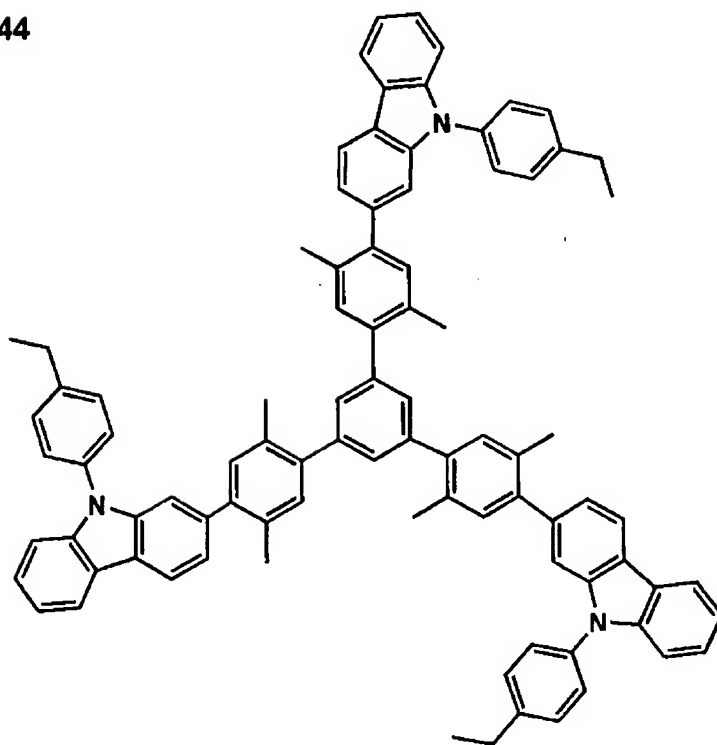
[0327]

[Chemical formula 277]

B8-43



B8-44

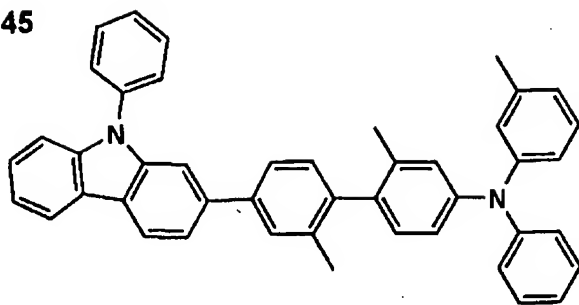


[0328]

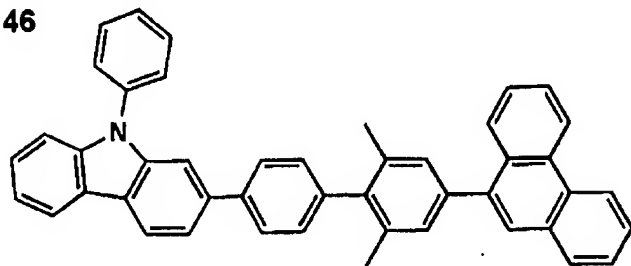
[Chemical formula 278]



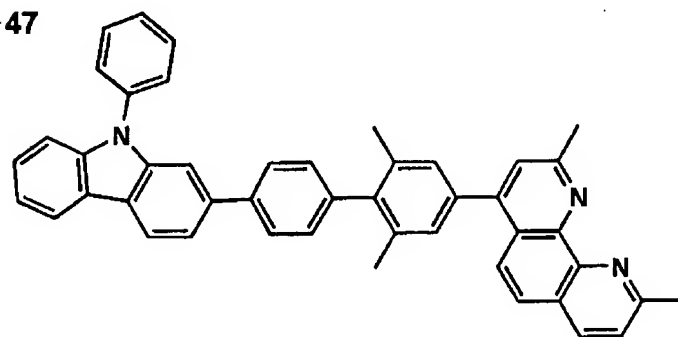
B8-45



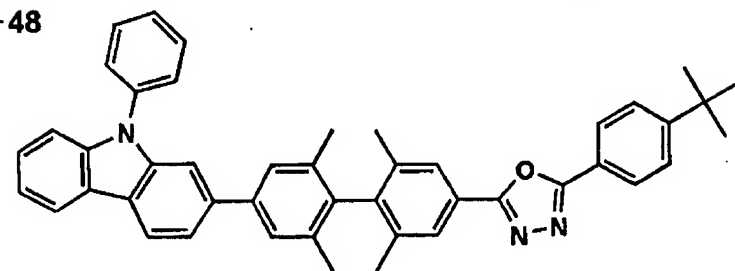
B8-46



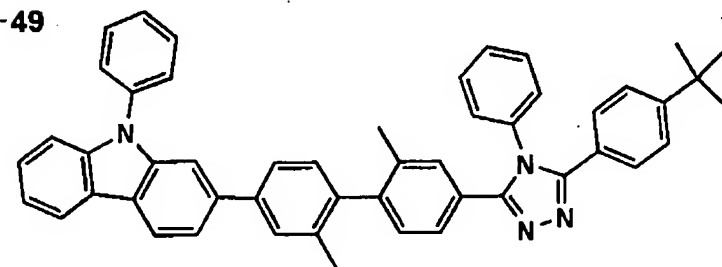
B8-47



B8-48

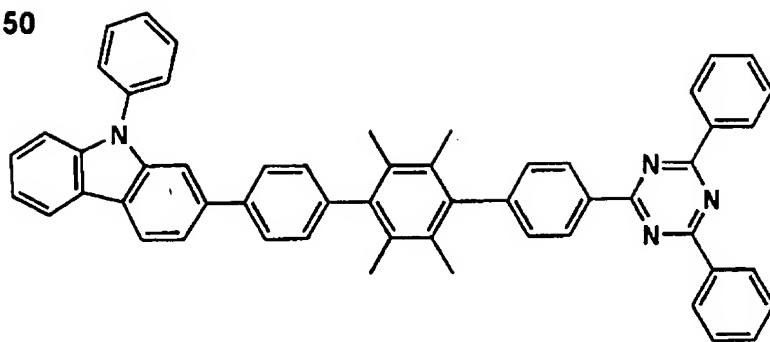
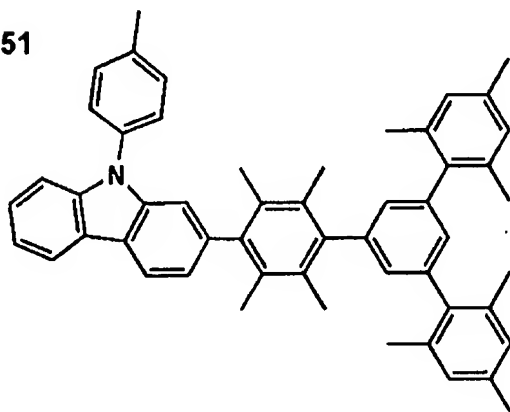
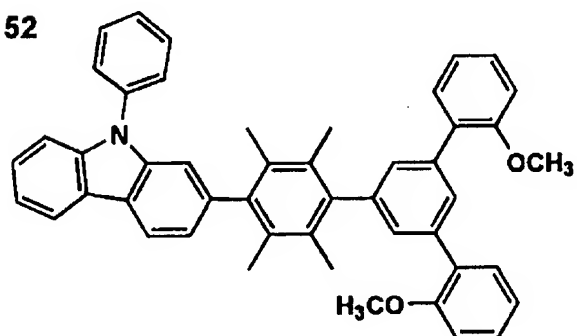
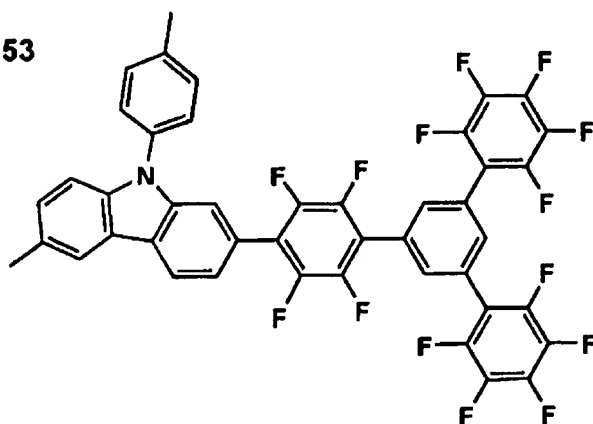


B8-49



[0329]

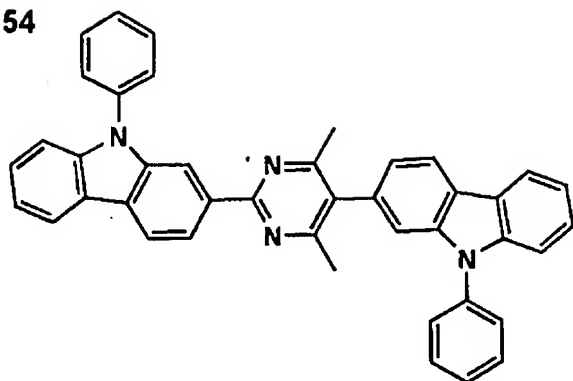
[Chemical formula 279]

**B8-50****B8-51****B8-52****B8-53**

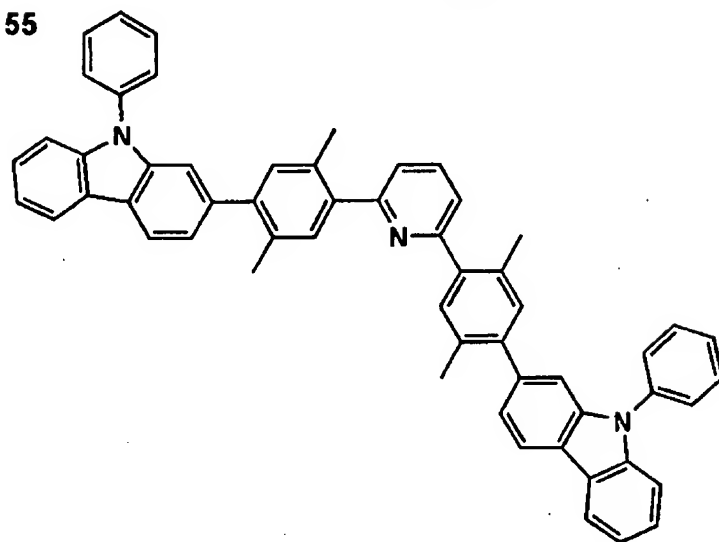
[0330]

[Chemical formula 280]

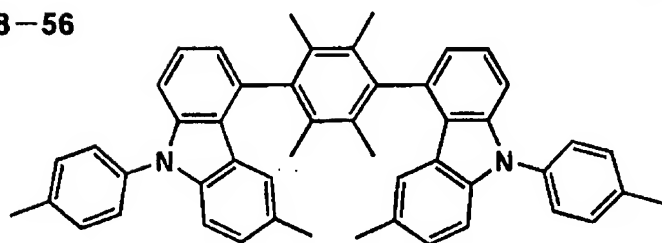
B8-54



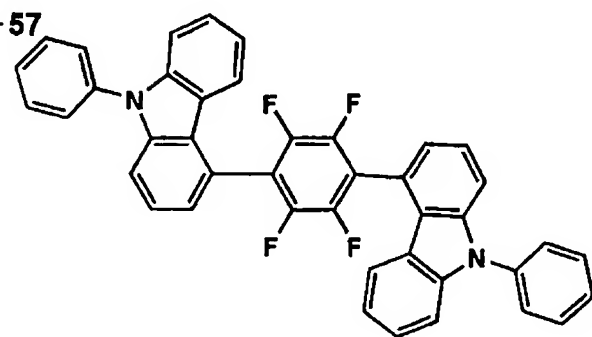
B8-55



B8-56



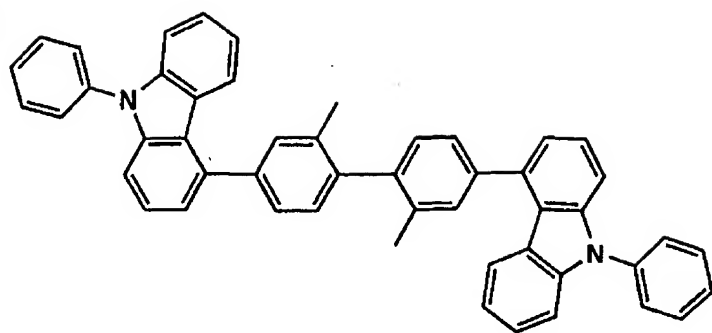
B8-57



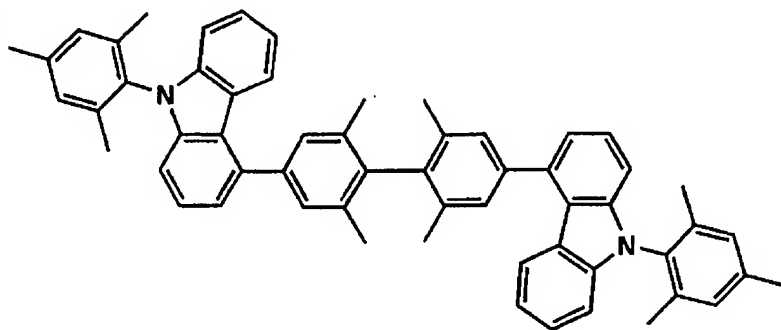
[0331]

[Chemical formula 281]

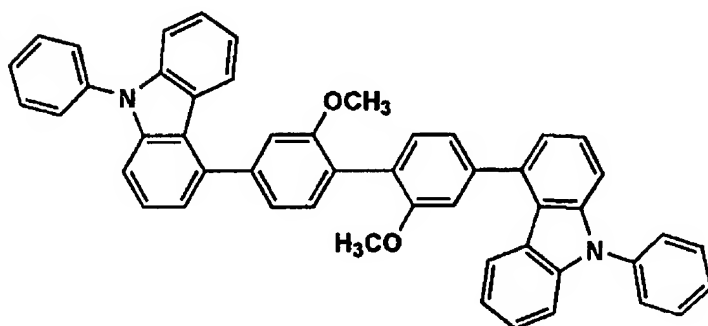
B8-58



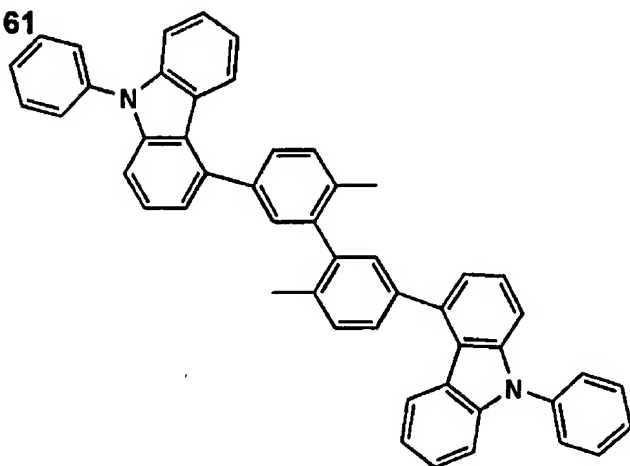
B8-59



B8-60

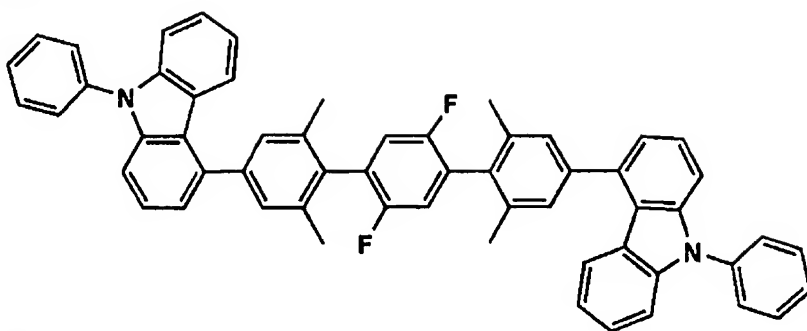
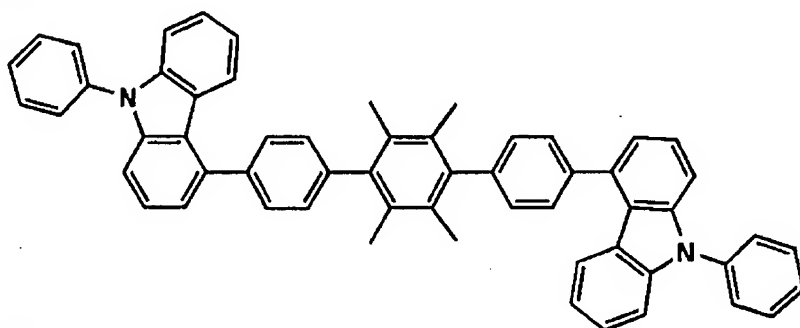
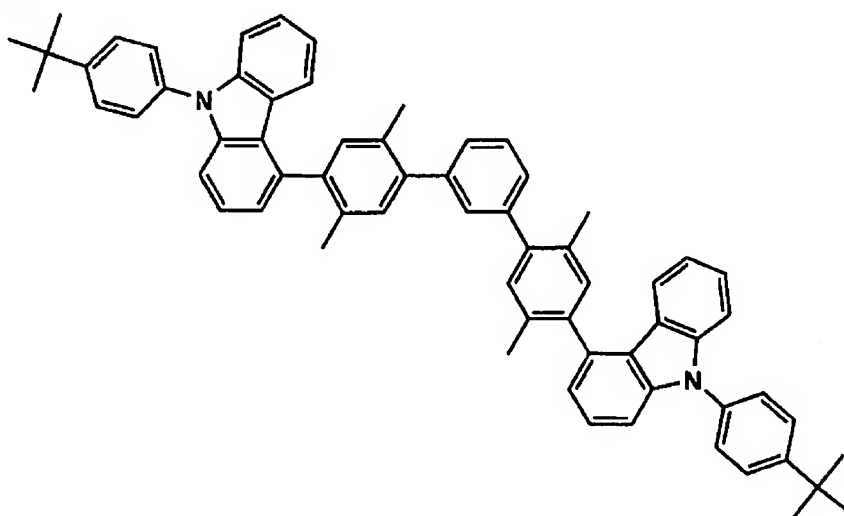


B8-61



[0332]

[Chemical formula 282]

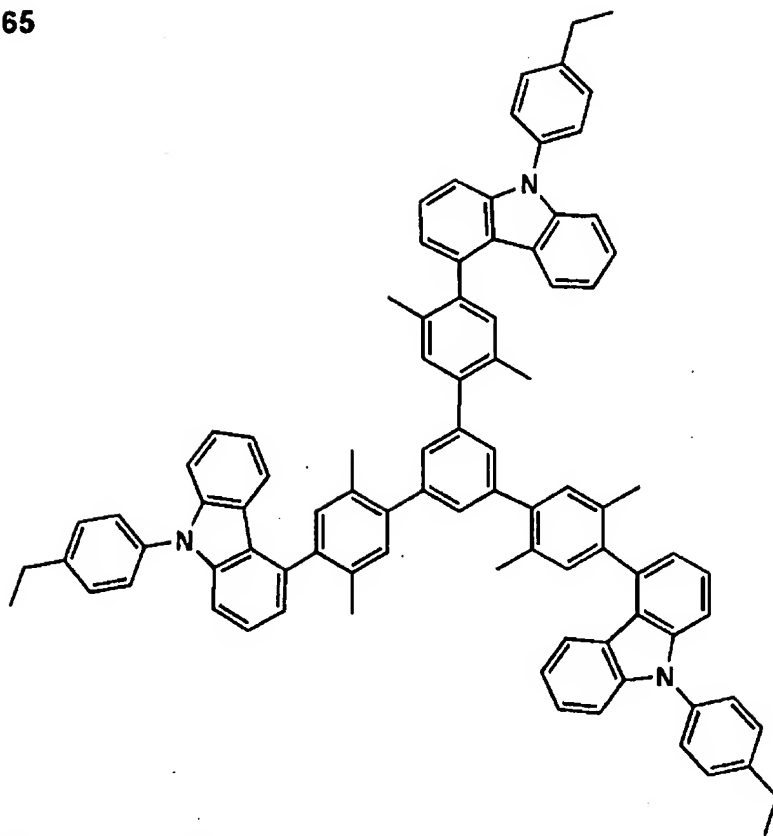
**B8-62****B8-63****B8-64**



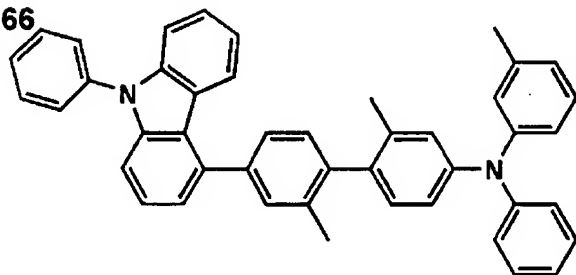
[0333]

[Chemical formula 283]

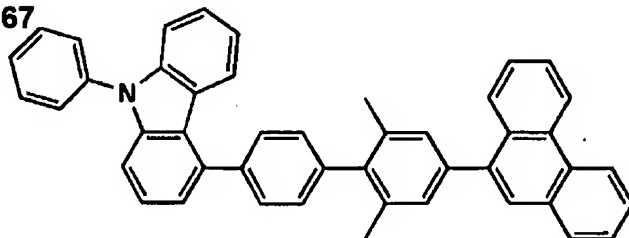
B8-65



B8-66



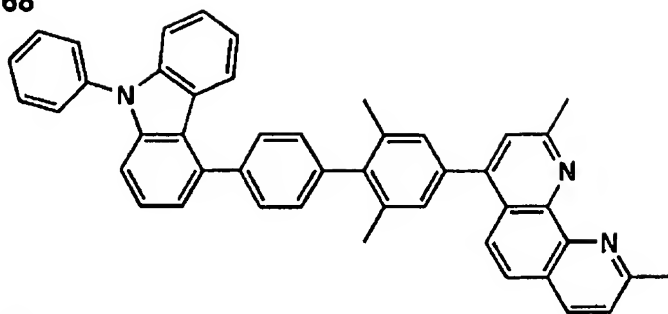
B8-67



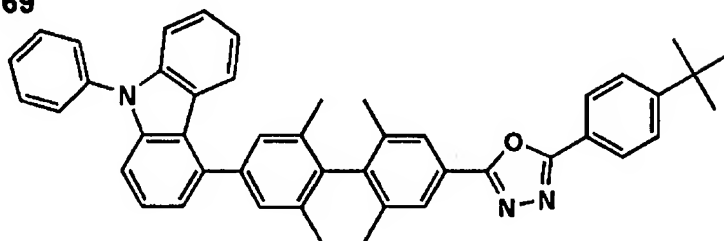
[0334]

[Chemical formula 284]

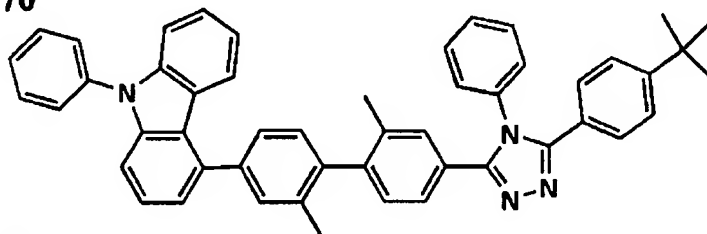
B8-68



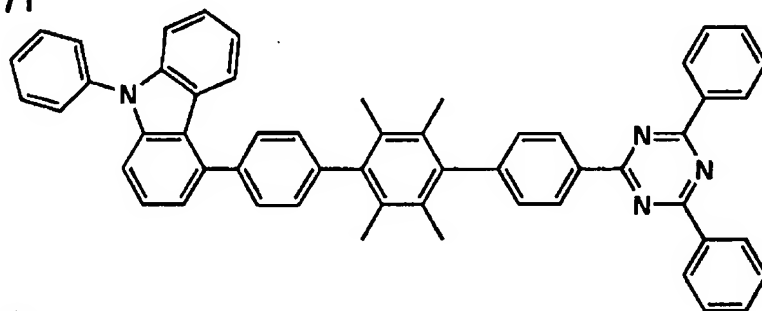
B8-69



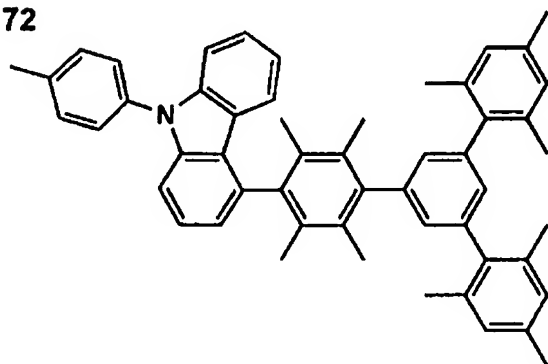
B8-70



B8-71

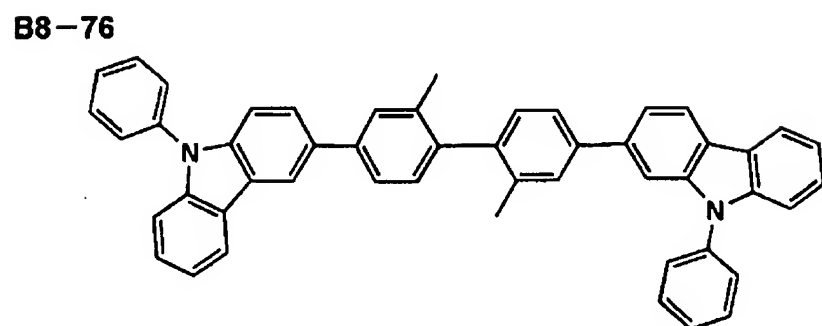
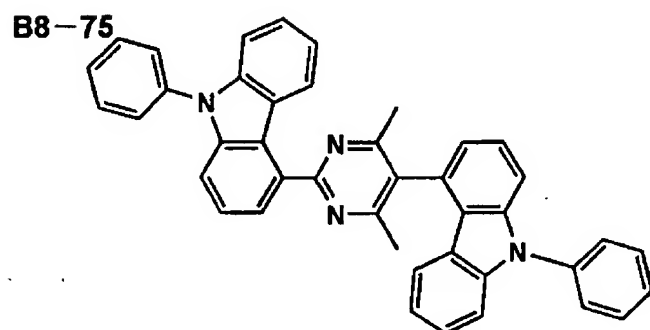
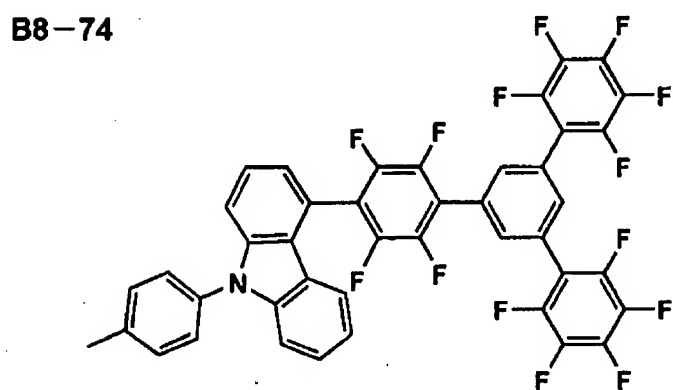
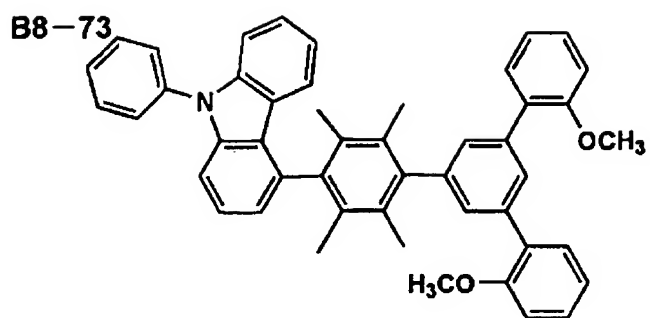


B8-72



[0335]

[Chemical formula 285]

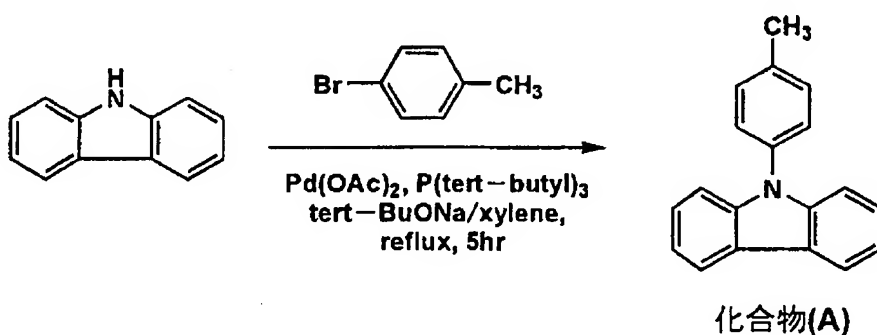


[0336]As for the molecular weight of these compounds, it is preferred that it is 600-2000. Tg (glass transition temperature) goes up that molecular weights are 600-2000, heat stability improves, and an element life is improved. More desirable molecular weights are 800-2000.

[0337]Next, the typical synthetic example of a compound denoted by a general formula (B8-1) is described. Synthetic example Composition of a compound (B8-2)

[0338]

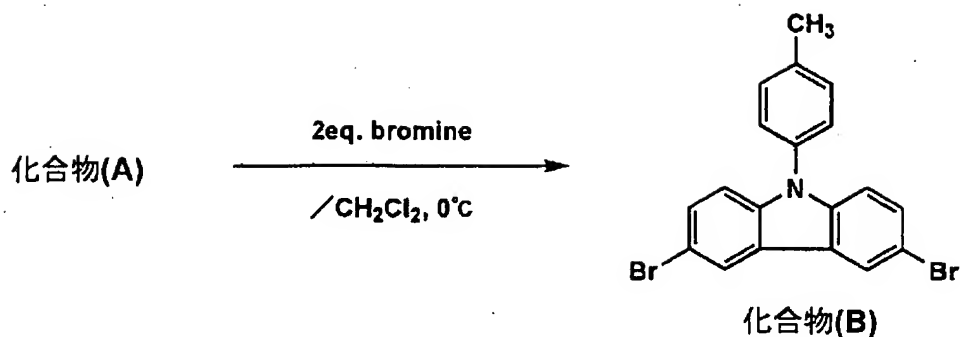
[Chemical formula 286]



[0339]0.33 g of palladium acetate and 1.4 ml of tri-tert-butyl phosphine were added to 200 ml of drying xylene under a nitrogen atmosphere. Then, 25 g, 25 g of carbazole, and 15 g of sodium tert-butoxide were added, and heating flowing back of the 4-bromo toluene was carried out for 6 hours. Then, 28g of compounds (A) were obtained by extraction processing, dryness, concentration, and carrying out column refining. (75% of \*\*\*\*)

[0340]

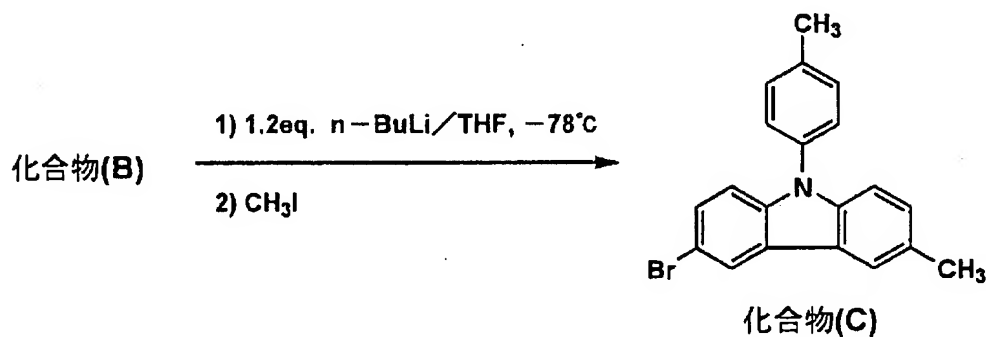
[Chemical formula 287]



[0341]Next, 25 g of compounds (A) were added to 800 ml of methylene chlorides, 31 g of bromine was dropped at this at 0 times, and a 38-g compound (B) was obtained as the extraction processing after 1-hour churning, dryness, concentration, and re-crystallizing. (94% of \*\*\*\*)

[0342]

[Chemical formula 288]



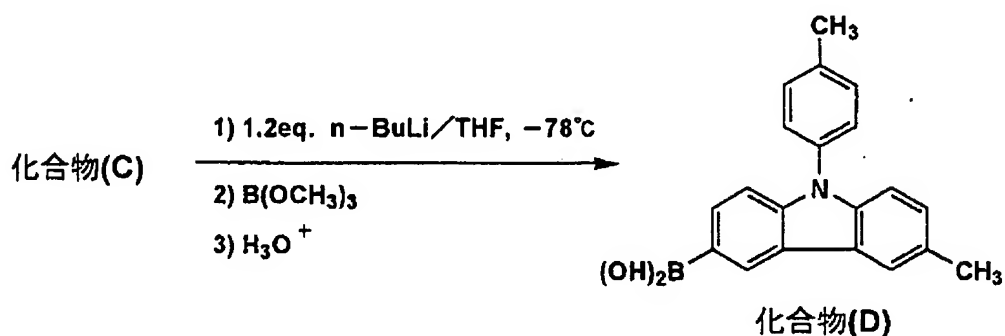
[0343]30 g of compounds (B) are dissolved in 450 ml of drying-under nitrogen atmosphere tetrahydro frans, -After 58 ml of n-butyl lithium hexane (1.5 M/L) solution was dropped at 60 \*\*



and 11 ml of iodine methane was dropped after 30-minute churning, it returned to room temperature and 20g of compounds (C) were obtained as extraction processing, dryness, concentration, and re-crystallizing. (80% of \*\*\*\*)

[0344]

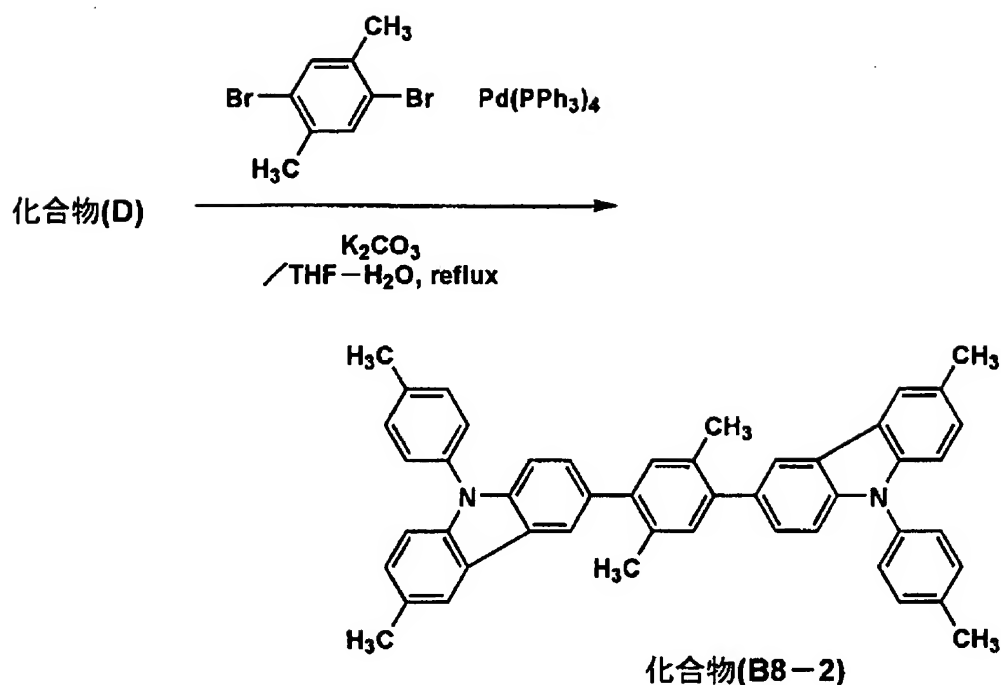
[Chemical formula 289]



[0345]20 g of compounds (C) are dissolved in 200 ml of drying-under nitrogen atmosphere tetrahydro frans, -After 48 ml of n-butyl lithium hexane (1.5 M/L) solution was dropped at 78 \*\* and 25 ml of tetrahydro franc solution of 15 ml of trimethoxy BORAN was dropped after 30-minute churning, acid was added to reaction solution and it was made pH=2. It used for the following step, without refining the reaction product containing the compound (D) produced by extracting reaction solution, drying and condensing.

[0346]

[Chemical formula 290]



[0347]The reaction product containing the obtained compound (D) and 6.85 g of 2 and 5-dibromo paraxylene are dissolved in 400 ml of tetrahydro francs, The solution which melted the potassium carbonate 15.7g in very a small amount of water was added, after blowing nitrogen for 15 minutes, 1.8g of tetrakistriphenyl phosphinepalladium (0) was added, and heating flowing back was carried out for 16 hours. 4.9g of compounds (B8-2) were obtained by performing extraction processing, dryness, concentration, column refining, and sublimation refining for reaction solution. (29% of \*\*\*\*) It checked that it was an object with NMR and a mass spectrum. It can manufacture by other methods also with same compound or publicly known methods.

[0348]The carbazole derivative compound denoted by a general formula (B9-1) is explained.

[0349]In a general formula (B9-1), a methyl group, an ethyl group, an iso-propyl group, a hydroxyethyl machine, a trifluoromethyl group, a tert-butyl group, etc. are mentioned, for example as an alkyl group respectively denoted by  $R_1 - R_8$ .

[0350]In a general formula (B9-1), a phenyl group, a naphthyl group, p-trill machine, p-chlorophenyl machine, etc. are mentioned, for example as an aryl group respectively denoted by  $R_1 - R_8$ .

[0351]In a general formula (B9-1), a methoxy group, an ethoxy basis, an iso-propoxy group, a butoxy machine, etc. are mentioned, for example as an alkoxyl group respectively denoted by  $R_1 - R_8$ .

[0352]In a general formula (B9-1), a phenoxy group, a naphthyloxy machine, etc. are mentioned, for example as an aryloxy group respectively denoted by  $R_1 - R_8$ .

[0353]In a general formula (B9-1), a methylthio group, an ethyl thio group, an iso-pro PIRUKIO machine, etc. are mentioned, for example as an alkylthio group respectively denoted by  $R_1 - R_8$ .

[0354]In a general formula (B9-1), a phenylthio group, the Naff Chill thio group, etc. are mentioned, for example as an arylthio group respectively denoted by  $R_1 - R_8$ .

[0355]In a general formula (B9-1), a dimethylamino group, a diethylamino machine, an ethyl methylamino machine, etc. are mentioned, for example as an alkylamino group respectively denoted by  $R_1 - R_8$ .

[0356]In a general formula (B9-1), an ANIRINO machine, a diphenylamino machine, etc. are mentioned, for example as an arylamino machine respectively denoted by  $R_1 - R_8$ .

[0357][ in a general formula (B9-1) ] [ as a heterocyclic machine respectively denoted by  $R_1 -$

$R_8$  ] For example, a pyridyl group, a thiazolyl machine, an oxazolyl machine, an imidazolyl group, A frill machine, a pyrrolyl machine, a pyrazinyl machine, a pyrimidinyl group, a PIRIDAJINIRU machine, a selenazolyl machine, the Sour Hora Nils machine, a piperidinyl machine, a pyrazolyl machine, a tetrazolyl group, a pyrrolidyl machine, a benzimidazolyl machine, a benzothiazolyl machine, a benzoxazolyl machine, etc. are mentioned.

[0358]In a general formula (B9-1), a trimethylsilyl machine, a tert-butyldimethylsilyl group, a dimethylphenyl silyl group, a bird phenyl silyl group, etc. are mentioned, for example as a silyl group respectively denoted by  $R_1 - R_8$ .

[0359]In the general formula (B9-1), the above-mentioned substituent respectively denoted by  $R_1 - R_8$  may have a substituent further.

[0360]It is preferred that at least one basis of the basis expressed with  $R_1 - R_8$  to Claim 2 like a description by this invention in the carbazole derivative compound denoted by said general formula (B9-1) is an aryl group.

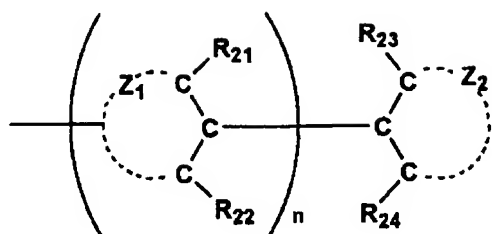
[0361]It is preferred that at least one of the substituents expressed with  $R_1 - R_8$  to Claim 4 in said general formula (B9-1) like a description has a carbazole skeleton (it is also called a carbazole mother nucleus) as a partial structure in this invention.

[0362]It is preferred that at least one basis of the basis denoted by  $R_1 - R_8$  has the partial structure denoted by the following general formula (B9-2) in this invention in the carbazole derivative compound denoted by said general formula (B9-1).

[0363]

[Chemical formula 291]

## 一般式(B9-2)



[0364] Here, the partial structure denoted by said general formula (B9-2) is explained.

[0365] In a general formula (B9-2), although  $Z_1$  and  $Z_2$  express an atomic group required to form an aromatic carbon ring or an aromatic heterocycle respectively and  $R_{21}$  -  $R_{24}$  express a hydrogen atom or a substituent respectively, at least one expresses a substituent and  $n$  expresses 0 or 1.

[0366] When  $n$  is 0, at least one of  $R_{23}$  and the  $R_{24}$  expresses a substituent, and when  $n$  is 1, at least one of  $R_{21}$  - the  $R_{24}$  expresses a substituent.

[0367] In a general formula (B9-2), a benzene ring, a NAFUTAREN ring, an indene ring, a tetraphosphorus ring, an anthracene ring, a phenanthrene ring, etc. are mentioned as an aromatic carbon ring respectively formed by  $Z_1$  and  $Z_2$ .

[0368] [ in a general formula (2) ] [ as an aromatic heterocycle respectively formed by  $Z_1$  and  $Z_2$  ] A furan ring, a pyrrole ring, a pyrazole ring, an imidazole ring, an oxazole ring, A thia ZORU ring, 1 and 2, 3-oxadiazole ring, 1 and 2, 3-triazole ring, A 1,2,4-triazole ring, a 1,3,4-thiadiazole ring, a pyridine ring, A PIRIDAJIN ring, a pyrimidine ring, a pyrazine ring, s-triazine ring, a benzofuran ring, an indole ring, a benzothiophene ring, a benzimidazole ring, a

benzothia ZORU ring, a pudding ring, a quinoline ring, an isoquinoline ring, etc. are mentioned.

[0369] Like the description to Claim 9 in this invention, it is preferred also in the above that  $Z_1$  and  $Z_2$  are benzene rings respectively.

[0370] [ in a general formula (B9-2) ] [ as a substituent denoted by  $R_{21} - R_{24}$  ] for example, an alkyl group (for example, a methyl group, an ethyl group, and an iso-propyl group.) A hydroxyethyl machine, a trifluoromethyl group, a tert-butyl group, etc., A cycloalkyl machine (for example, a cyclopentyl group, a cyclohexyl group, etc.), Alkyl groups (for example, benzyl group etc.), an alkoxyalkyl group. for example, a methoxymethyl machine, methoxy ethyl group, and ethoxymethyl machine. aryl groups (for example, a phenyl group and a naphthyl group.), such as a propoxy ethyl group Alkenyl groups, such as p-trill machine and p-chlorophenyl machine. for example, 2-propenyl machine, 3-butenyl group, and a 1-methyl 3-propenyl machine. 3-pentenyl machine, a 1-methyl 3-butenyl group, a 4-hexenyl machine, Alkynyl groups, such as a vinyl group and a styryl machine (an ethynyl group, a propargyl machine, etc.), an alkoxy group (for example, a methoxy group, an ethoxy basis, and an iso-propoxy group.) aryloxy groups (for example, a phenoxy group, a naphthyloxy machine, etc.), such as a butoxy machine, alkylthio groups (for example, a methylthio group, an ethyl thio group, an iso-pro PIRUKIO machine, etc.), and an arylthio group (a phenylthio group.) amino groups, such as the Naff Chill thio group, and an alkylamino group (for example, a dimethylamino group.) arylamino machines (an ANIRINO machine.), such as a diethylamino machine and an ethyl methylamino machine halogen atoms (a fluorine atom, a chlorine atom, and a bromine atom.), such as a diphenylamino machine a cyano group, a nitro group, and heterocyclic machines (for example, a pyridyl group.), such as an iodine atom A thiazolyl machine, an oxazolyl machine, an imidazolyl group, a frill machine, a pyrrolyl machine, A pyrazinyl machine, a pyrimidinyl group, a PIRIDAJINIRU machine, a selenazolyl machine, The Sour Hora Nils machine, a piperidinyl machine, a pyrazolyl machine, a tetrazolyl group, Silyl groups (for example, a trimethylsilyl machine, a tert-butyldimethylsilyl group, a dimethylphenyl silyl group, a bird phenyl silyl group, etc.), such as a pyrrolidyl machine, a benzimidazolyl machine, a benzothiazolyl machine, and a benzoxazolyl machine, etc. are mentioned. The above-mentioned substituent may have a substituent further further.

[0371] In a general formula (B9-2), especially preferably, it is a time of at least one of  $R_{21}$  - the  $R_{24}$  being an alkyl group, and when  $n$  is 0 more preferably and  $R_{23}$  and  $R_{24}$  are substituents, the time of  $n$  being 1 and all of  $R_{21}$  -  $R_{24}$  being substituents is the most preferred.

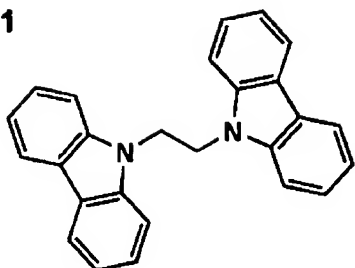
[0372] Here, the substituent denoted by  $R_{21}$  -  $R_{24}$  is synonymous with each basis denoted by  $R_1$  -  $R_8$  in the above-mentioned general formula (B9-1).

[0373] Although the concrete target of the compound denoted by a general formula (B9-1) below is shown, this invention is not limited to these.

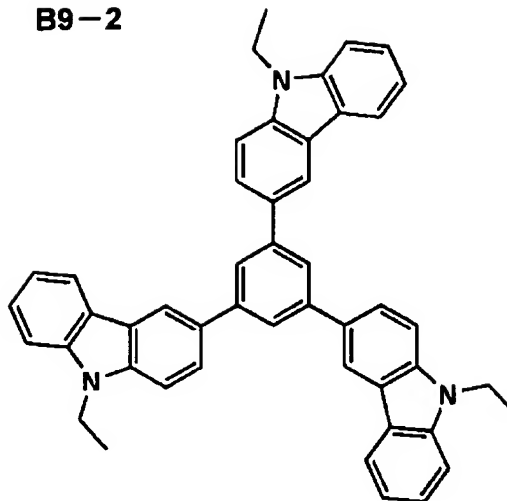
[0374]

[Chemical formula 292]

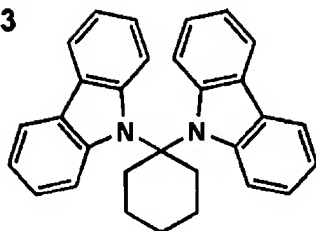
**B9-1**



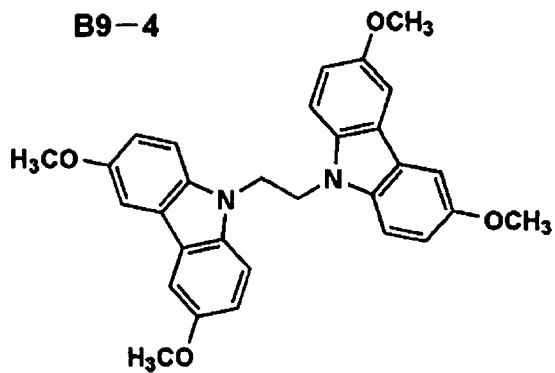
**B9-2**



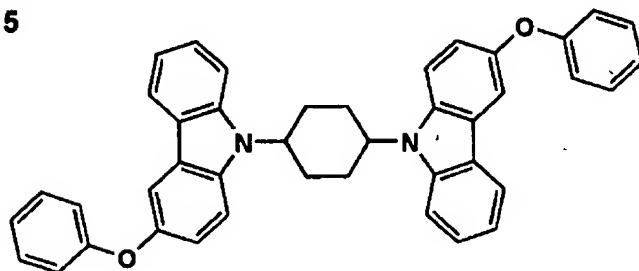
**B9-3**



**B9-4**



B9-5

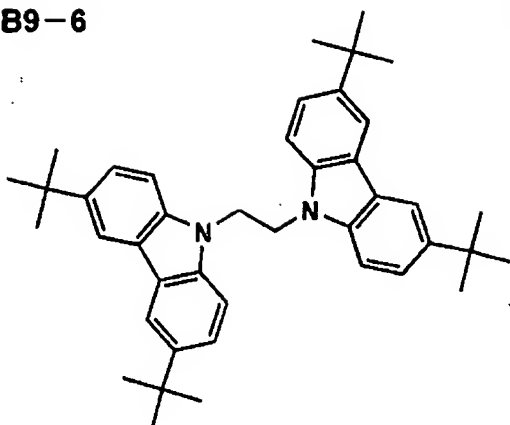


[0375]

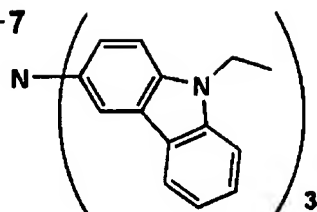


[Chemical formula 293]

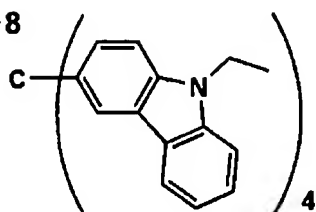
B9-6



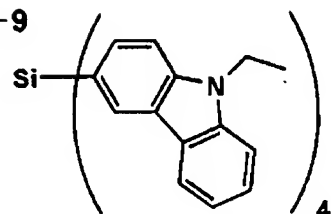
B9-7



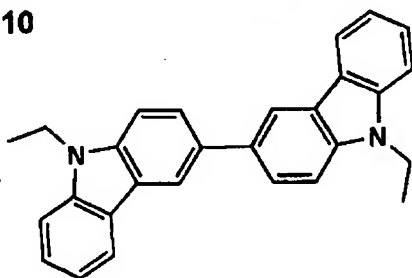
B9-8



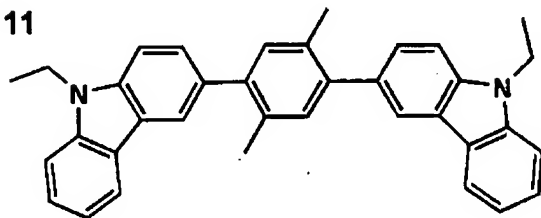
B9-9



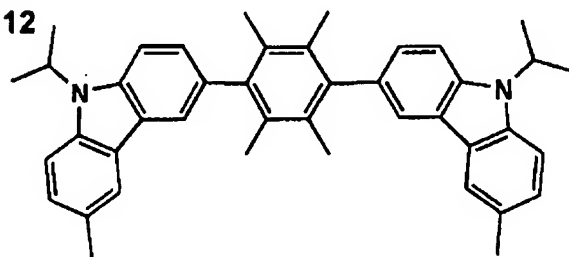
B9-10



B9-11

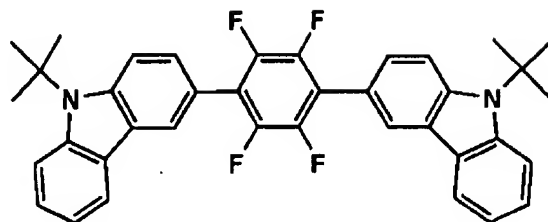
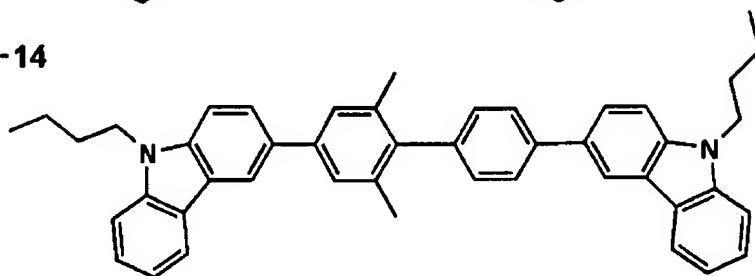
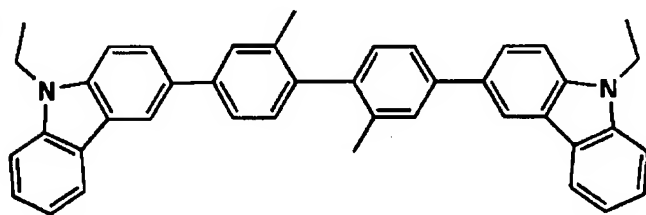
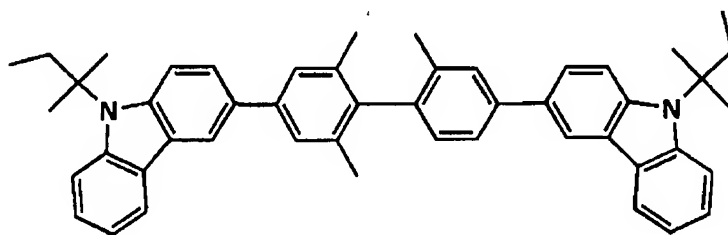
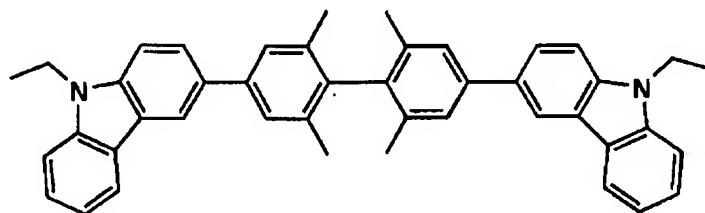


B9-12



[0376]

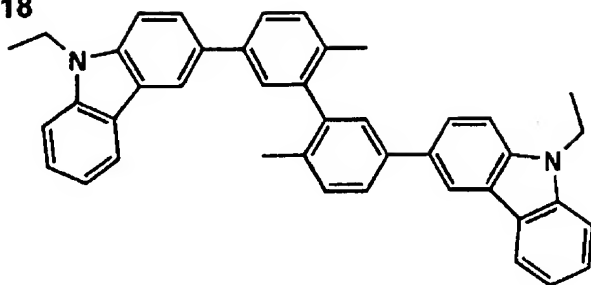
[Chemical formula 294]

**B9-13****B9-14****B9-15****B9-16****B9-17**

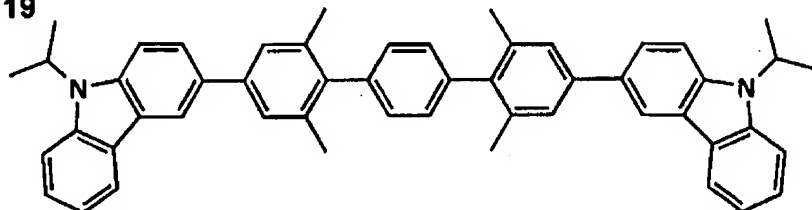
[0377]

[Chemical formula 295]

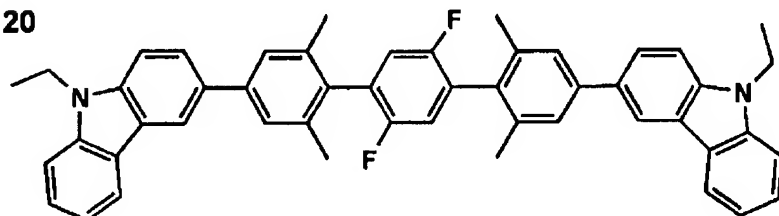
B9-18



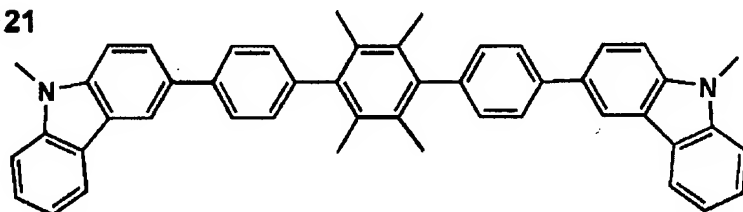
B9-19



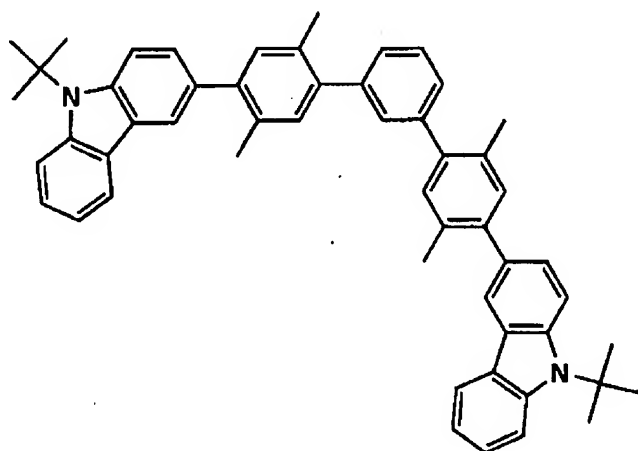
B9-20



B9-21



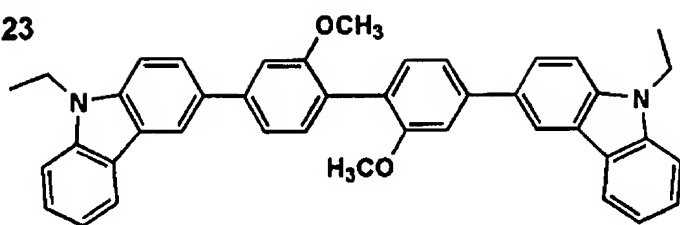
B9-22



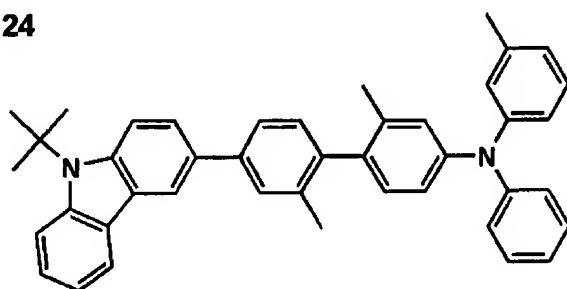
[0378]

[Chemical formula 296]

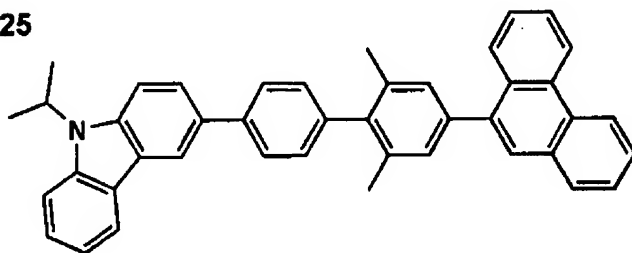
B9-23



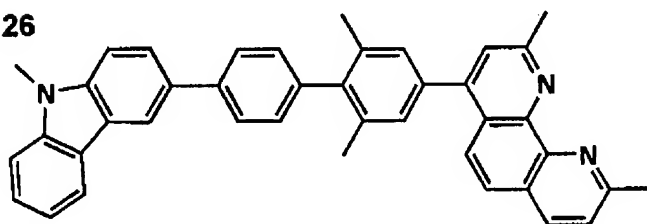
B9-24



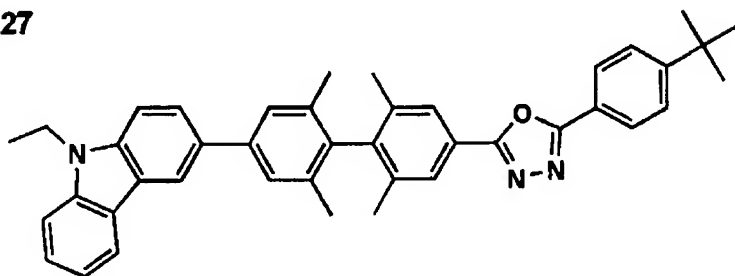
B9-25



B9-26



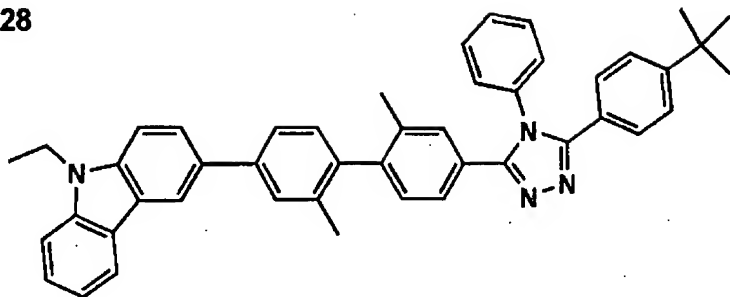
B9-27



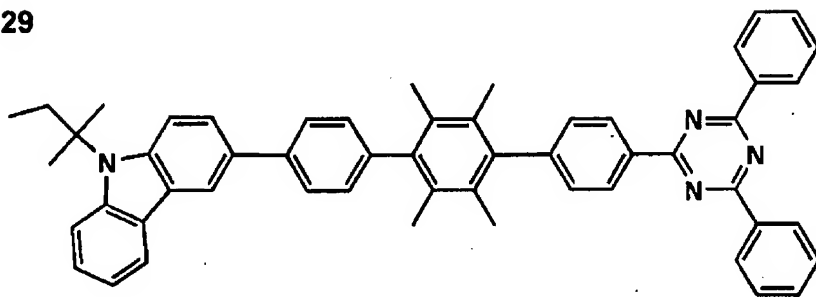
[0379]

[Chemical formula 297]

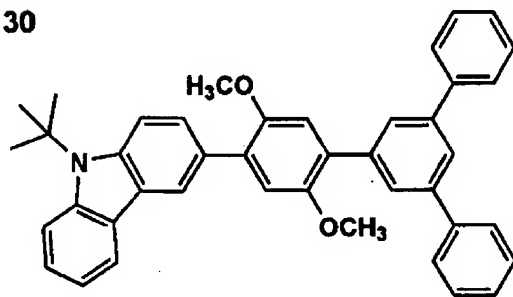
**B9-28**



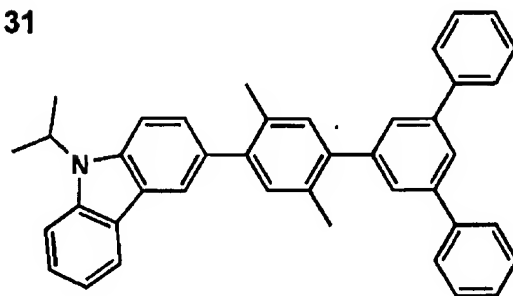
**B9-29**



**B9-30**



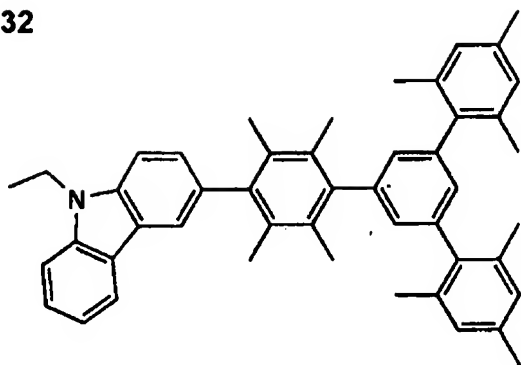
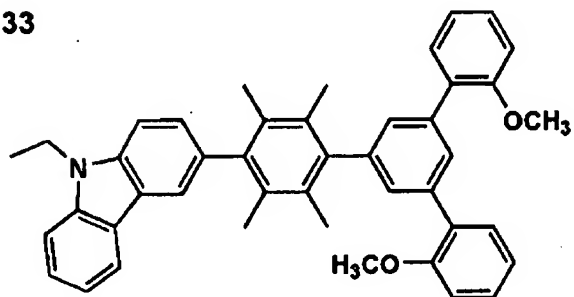
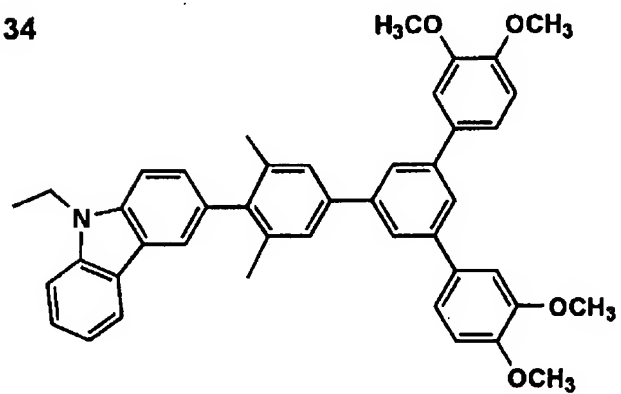
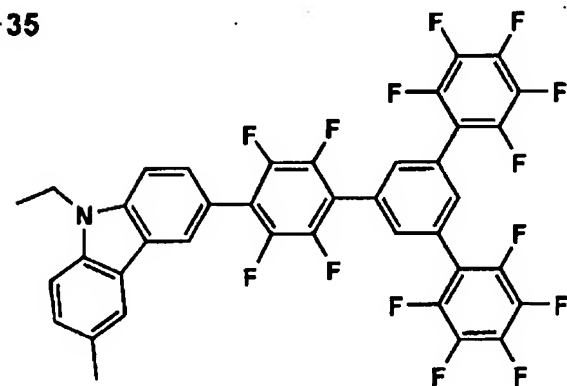
**B9-31**





[0380]

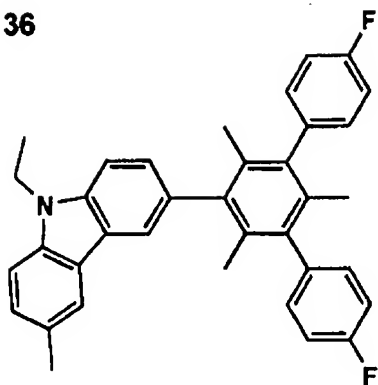
[Chemical formula 298]

**B9-32****B9-33****B9-34****B9-35**

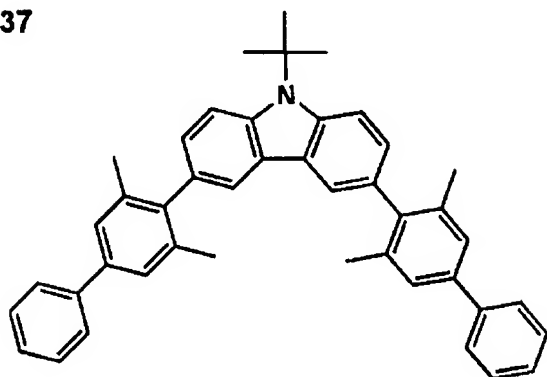
[0381]

[Chemical formula 299]

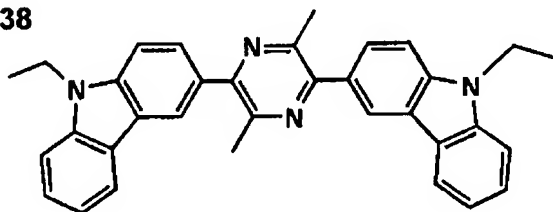
**B9-36**



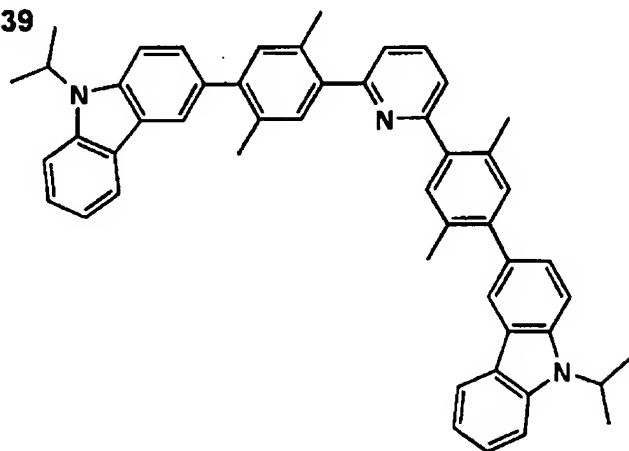
**B9-37**



**B9-38**

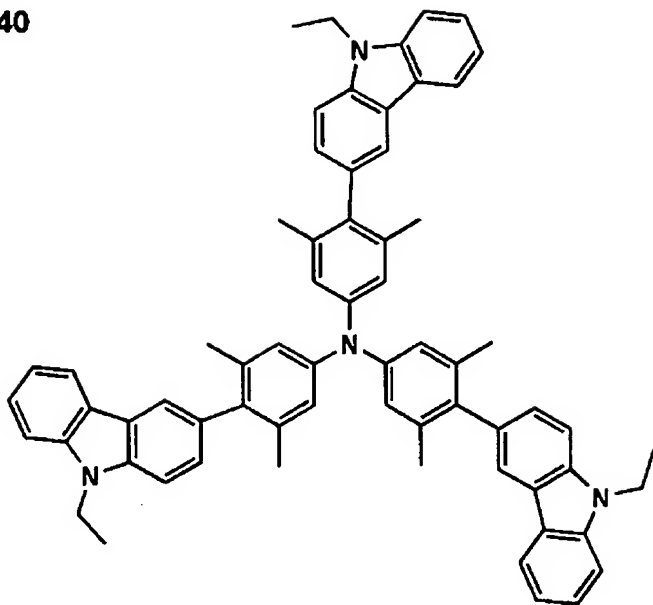
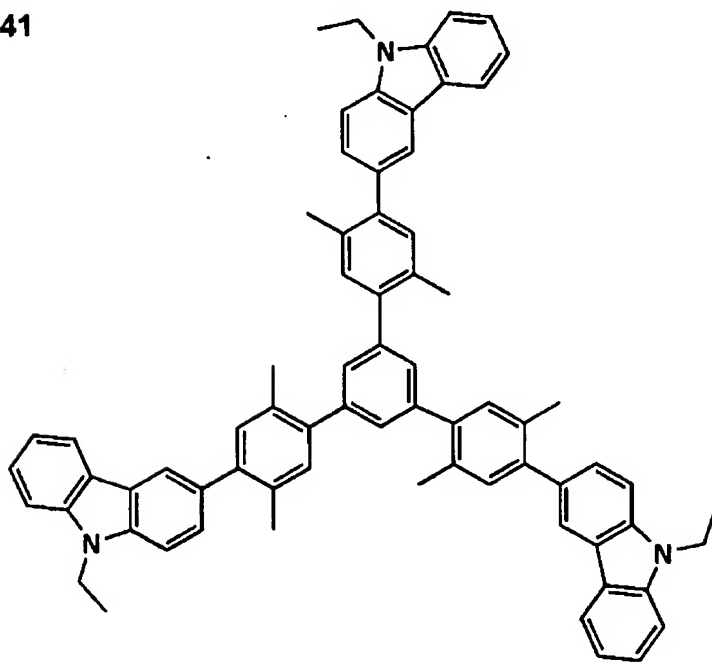


**B9-39**



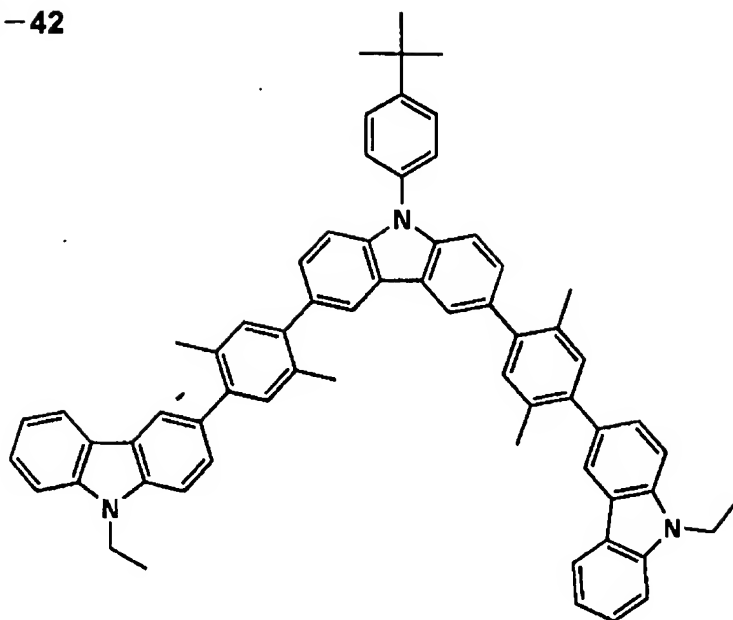
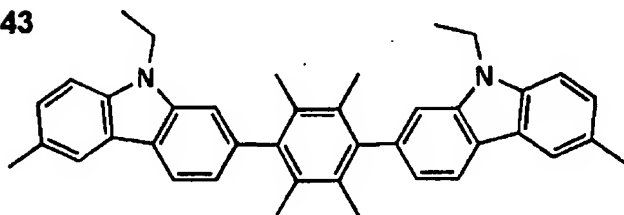
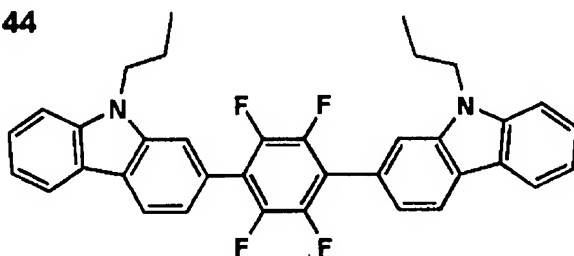
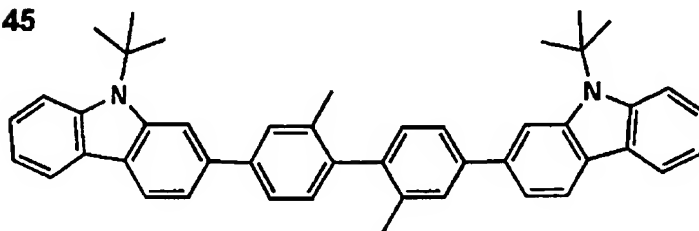
[0382]

[Chemical formula 300]

**B9-40****B9-41**

[0383]

[Chemical formula 301]

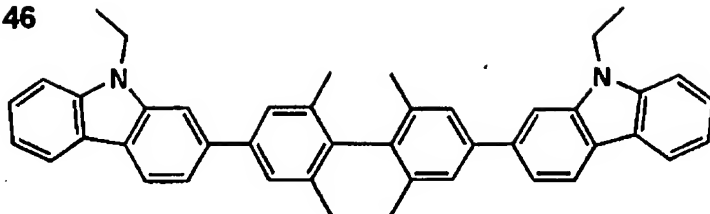
**B9-42****B9-43****B9-44****B9-45**

[0384]

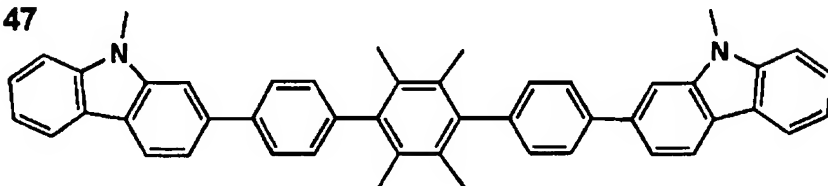
[Chemical formula 302]



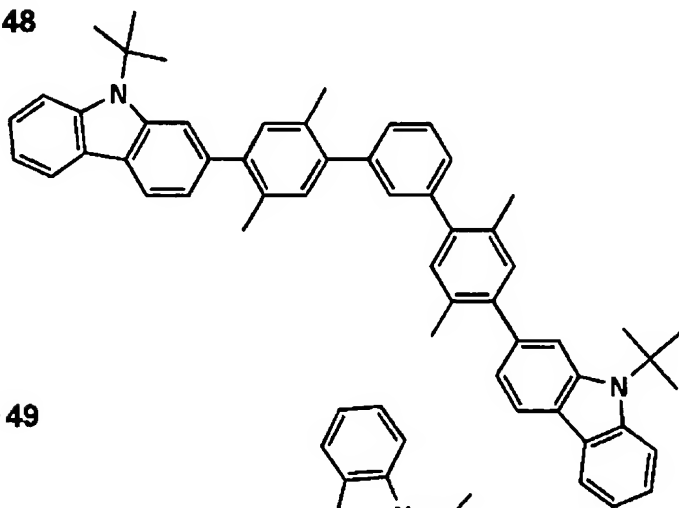
B9-46



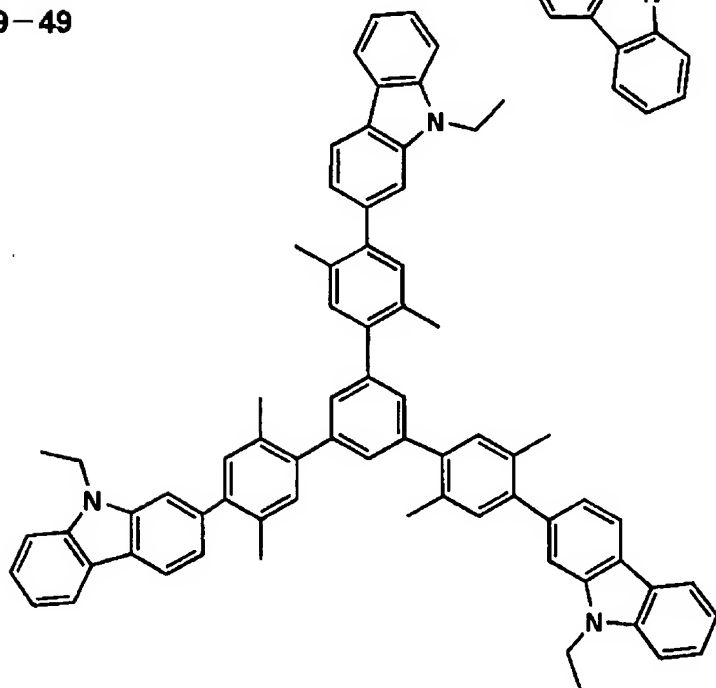
B9-47



B9-48

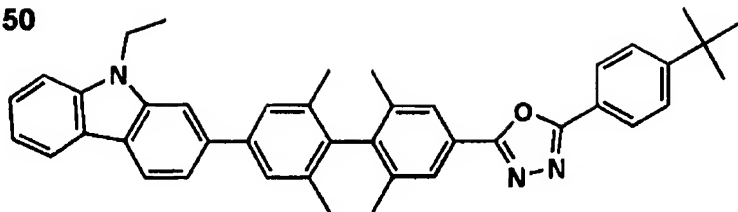
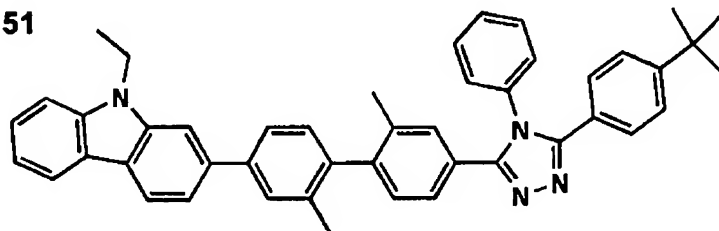
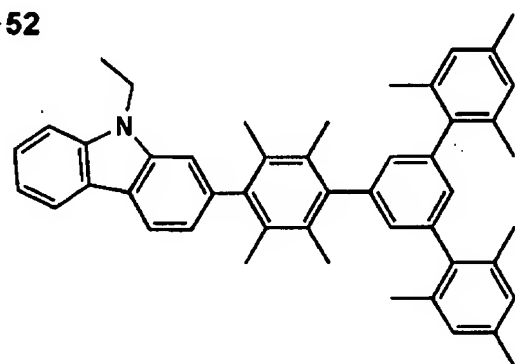
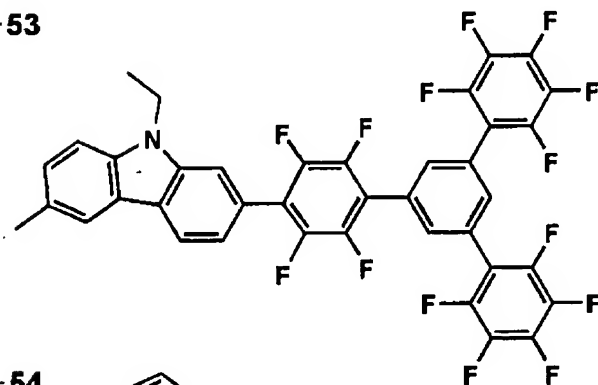
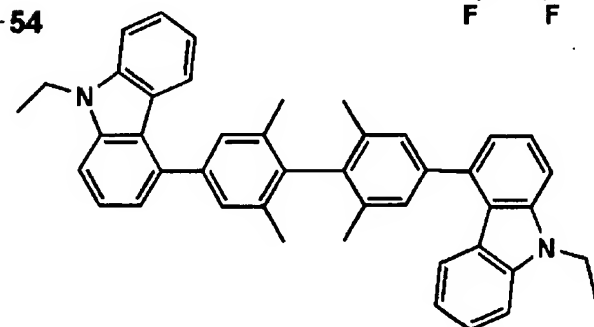


B9-49



[0385]

[Chemical formula 303]

**B9-50****B9-51****B9-52****B9-53****B9-54**

[0386]As for the molecular weight of a carbazole derivative compound denoted by said general formula (B9-1), it is preferred that it is in the range of 350-2000, The heat stability of this element is raised, and it is desirable still more preferred that it is the range of 600-2000, and the ranges of the molecular weight of the viewpoint of element life extension to said carbazole derivative compound are 800-2000.

[0387][ as content in the inside of any one layer which constitutes the organic electroluminescence element of the carbazole derivative compound denoted by the general formula (B9-1) concerning this invention ] Desirable still more preferably, it is 80 mass % - 95 mass % that it is more than 50 mass %, and they are 90 mass % - 95 mass % especially preferably.

[0388]Although the carbazole derivative compound concerning this invention denoted by a general formula (B9-1) can be conventionally manufactured by a publicly known method, with reference to the synthesizing method of a description, it is compoundable for the synthetic example 1 (composition of compound B9-11) as shown below, for example.

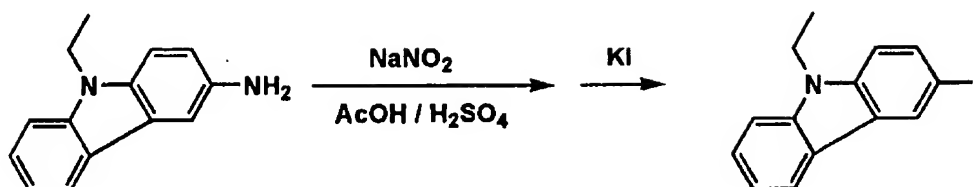
[0389]Hereafter, one mode of the synthetic example of a carbazole derivative compound denoted by a general formula (1) concerning this invention is shown.

[0390]The example of <<composition: Composition [ of compound B9-11 ]>>

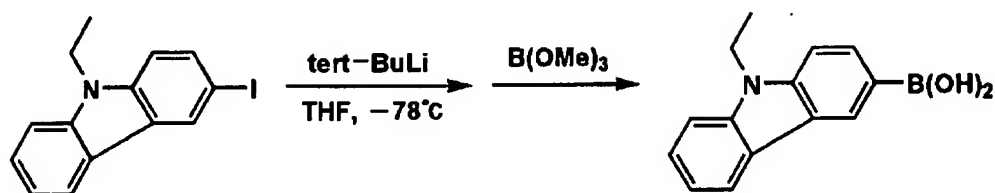
[0391]

[Chemical formula 304]

スキーム1

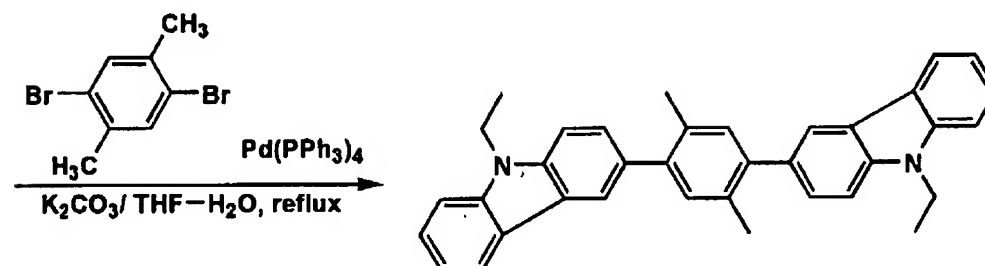


スキーム2



反応生成物1

スキーム3



化合物B9-11

[0392](Scheme 1) 3-iodine 9-ethyl carbazole (25g) composition of the synthetic 3-amino 9-ethyl carbazole (50g) of :3-iodine 9-ethyl carbazole was carried out by the Sand Mai Ya reaction.

[0393](Scheme 2) : under  $-78^\circ\text{C}$ , n-butyl lithium was dropped (3.5 ml), the tetrahydrofuran

solution containing the synthetic 3-iodine 9-ethyl carbazole (1.7g) of the reaction product 1 was agitated, and 30 minutes afterward, trimethoxy BORAN was dropped (1.5 ml) and agitated for 12 hours. The solution after churning was extracted and condensed and the reaction product 1 was acquired.

[0394](Scheme 3) : The synthetic profitable \*\*\*\* reaction product 1 of compound B9-11 1, the 4-dibromo 2, 5-methylbenzene (0.47g), It was made to dissolve in the tetrahydro franc (300 ml) containing tetrakis(triphenyl phosphine)palladium (0.4g) and potassium carbonate (1.0g) and the mixed solvent which comprises water (30 ml), and 70 \*\* was agitated for 6 hours.

[0395]Compound B9-11 (1.5g) was obtained by performing extraction, dryness, concentration, column refining, and sublimation refining for reaction solution.

[0396]The molecular structure of compound B9-11 checked that it was an object with NMR (nuclear magnetic resonance spectrum) and a mass spectrum.

[0397]The compound denoted by a general formula (B10-1) is explained.

[0398][ in a general formula (B10-1) ] [ as a substituent denoted by  $R_1 - R_3$  ] respectively -- an alkyl group (a methyl group, an ethyl group, i-propyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, alkyloxy machines (a methoxy group.), such as a cyclohexyl group and a benzyl group Aryloxy groups (phenoxy group etc.), such as an ethoxy basis, i-propoxy group, and a butoxy machine, and halogen atoms (a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc.) are shown, and adjoining substituents may be condensed mutually and they may form a ring.

[0399]Although Ar expresses a condensation aromatic series machine in a general formula (B10-1), As a condensation aromatic series machine in this case, a hydrocarbon ring system aromatic series machine or a heterocyclic system aromatic series machine may be used, For example, a naphthyl group, a phenanthrene machine, an anthryl group, a pyrenyl machine, a quinolyl machine, a carbazolyl machine, a benzimidazolyl machine, a pyrrolo pyrazolyl

machine, an imidazo pyridyl group, a pyrazolo triazoryl machine, etc. are mentioned as the example of representation.

[0400]These compounds are compounds which have strong fluorescence in a solid state. It excels also in electric field luminescence and can be effectively used as a luminescent material.

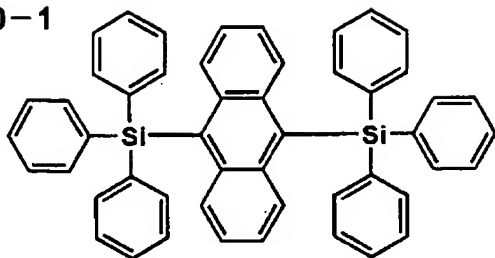
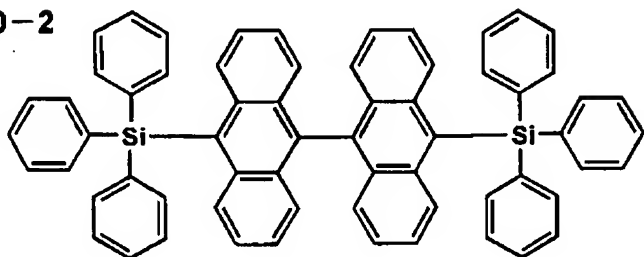
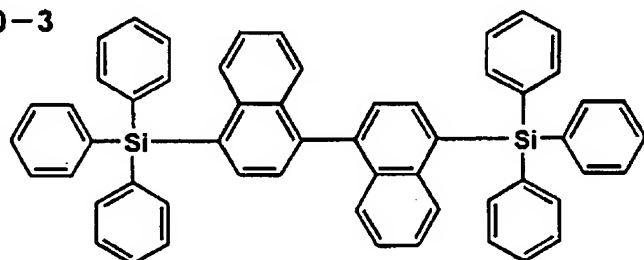
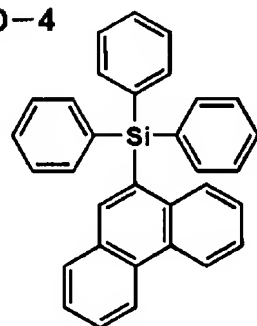
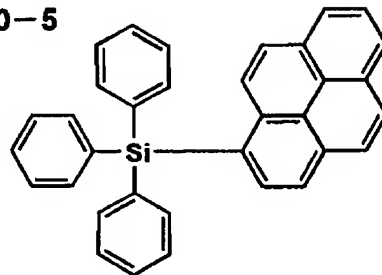
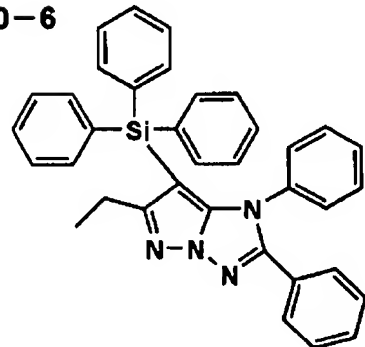
Since it excels in electronic pouring nature and electron transport property outstanding from the metal electrode very much, when these compounds are used as an electronic transportation material (or hole blocker), the outstanding luminous efficiency is shown in the element using other luminescent materials or the compound of this invention as a luminescent material.

[0401]Although the example of a concrete compound is given to below, this invention is not limited to these.

[0402]

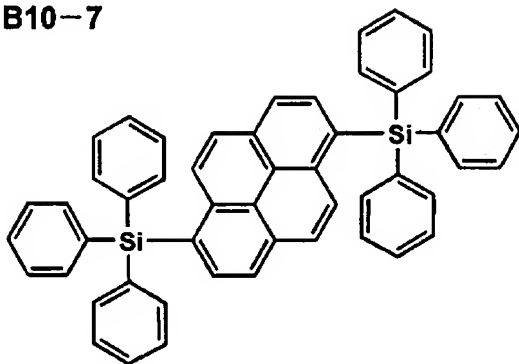
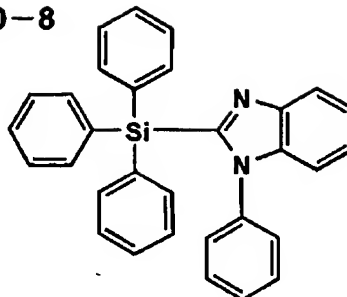
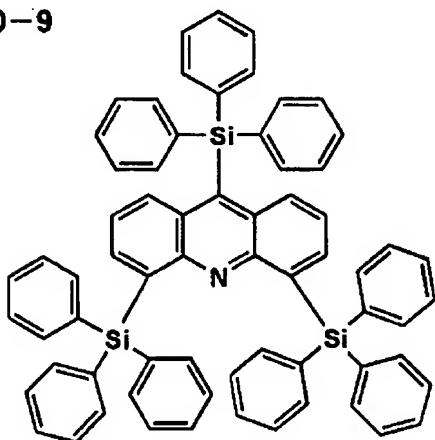
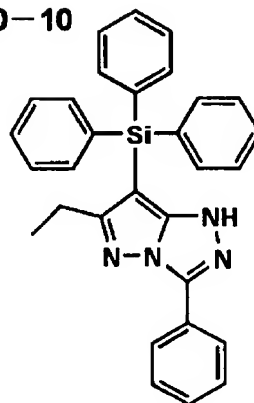
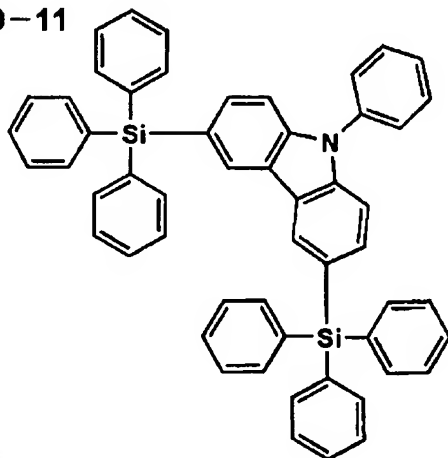
[Chemical formula 305]



**B10-1****B10-2****B10-3****B10-4****B10-5****B10-6**

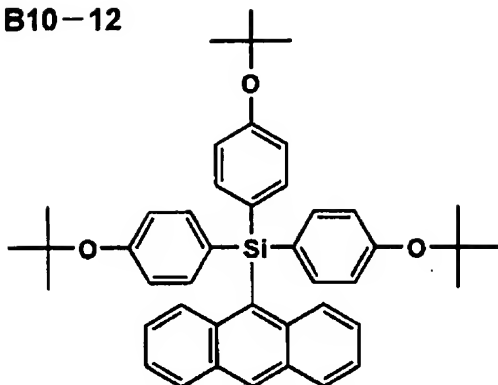
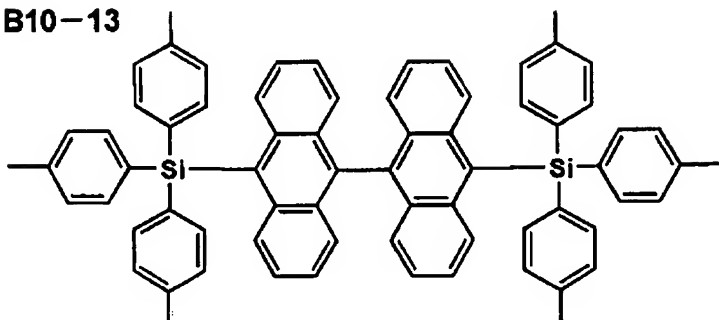
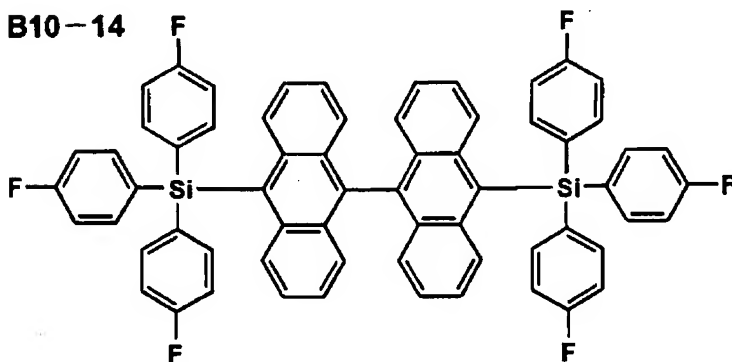
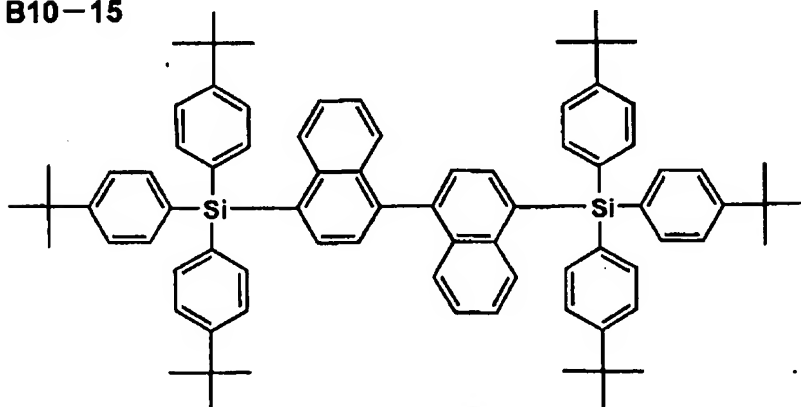
[0403]

[Chemical formula 306]

**B10-7****B10-8****B10-9****B10-10****B10-11**

[0404]

[Chemical formula 307]

**B10-12****B10-13****B10-14****B10-15**

[0405]Synthetic example The reaction below composition of compound B10-1 (9, 10-JI (bird phenyl silyl) anthracene) was performed under dry nitrogen-gas-atmosphere mind.

[0406]9, 3.36 g (10mmol) of 10-dibromo anthracene, 4.52 ml (30mmol) of tetramethylethylene diamine, 32 ml of drying ether, and 100 ml of drying tetrahydro francs were put into a three-lot flask, and it kept at -55--50 \*\*, agitating. 15.5 ml (25mmol) of N-butyl lithium hexane solutions (1.6M) were added by the syringe. 8.82 g (30mmol) of bird phenyl chloro SHIRAN which melted the reaction solution of dark red in a 10-ml drying tetrahydro franc after 1-hour churning at the temperature was dropped. It \*\*\*\*(ed) gradually and agitated at room temperature for further 12 hours. After adding distilled water and stopping a reaction, distilled water washed, the organic layer was dried with anhydrous potassium carbonate, \*\*\*\* was condensed by the rotary evaporator and decompression dryness was carried out.

[0407]Rf value about 0.25 ingredient was separated by silica gel column chromatography (hexane: chloroform =1:2), and it re-crystallized repeatedly by hexane.

[0408]1.74g (about 25%) of yield  $^1\text{H-NMR}$  ( $\text{CDCl}_3$ , TMS) delta 6.78 (d,  $J=7.01$ , 2H, ArH), 6.79 (d,  $J=6.77$ , 2H, ArH), 7.24-7.41 (m, 12H, PhH), 7.63-7.66 (m, 18H, PhH), 8.04 (d,  $J=7.01$ , 2H, ArH), and 8.05 (d,  $J=6.77$ , 2H, ArH) -- the compound denoted by said general formula (B11-1) is explained.

[0409][ in said general formula (B11-1) ] [ as a substituent denoted by R and R' ] an alkyl group (a methyl group, an ethyl group, i-propyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, aryl groups (a phenyl group and a naphthyl group.), such as a cyclohexyl group and a benzyl group p-trill machine, p-chlorophenyl machine, a pyrrole group, a pyridyl group, a benzimidazolyl machine, A benzothiazolyl machine, a benzoxazolyl machine, a triazolyl machine, an oxadiazolyl machine, alkenyl groups (a vinyl group.), such as a thiadiazolyl machine, a thienyl group, and a carbazolyl machine alkynyl groups (ethynyl group etc.) and alkyloxy machines (a methoxy group.), such as a propenyl machine and a styryl machine Aryloxy groups, such as an ethoxy basis, i-propoxy group, and a butoxy machine (phenoxy group etc.), An alkylthio group (a methylthio group, an ethyl thio group, i-pro PIRUKIO machine, etc.), Arylthio groups

(phenylthio group etc.), an amino group, an alkylamino group, arylamino machines (a dimethylamino group, a diethylamino machine, an ethyl methylamino machine, etc.) (an ANIRINO machine, a diphenylamino machine, etc.), a halogen atom (a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc.), A cyano group, a nitro group, non-aromatic compound nature heterocyclic machines (a pyrrolidyl machine, a pyrazolyl machine, an imidazolyl group, etc.), silyl groups (a trimethylsilyl machine, t-butyldimethylsilyl group, a dimethylphenyl silyl group, a bird phenyl silyl group, etc.), etc. are mentioned. Each substituent may have a substituent further.

[0410]In this, an aryl group, an alkenyl group, and an alkynyl group are mentioned as a desirable thing. When two or more R may be condensed mutually and may form a ring, when n expresses the integer of 0-4, m expresses the integer of 0-4 and n expresses an integer greater than or equal to 2, and m expresses an integer greater than or equal to 2, two or more R' may be condensed mutually and may form a ring.

[0411]As a divalent connection machine denoted by L1 and L2, the divalent connection machine of non-aromatic systems, such as an alkylene and alkenylene, or the divalent connection machine of an aromatic series system is expressed. Although these may be replaced although it is an alkylene machine preferably among the divalent connection machines of a non-aromatic system, for example, bases, such as an alkylene and alkenylene, and the basis mentioned by said R, R', etc. as a substituent is mentioned, it is an alkylene machine which is not replaced, such as methylene and ethylene, preferably. Bases, such as the substituent of these non-aromatic system, for example, an alkylene etc., may have the ether, CHIOETERU, and imino structure where bases which the carbon atom used as a frame constitutes, such as methylene or substitution methylene, were replaced by hetero atoms, such as an oxygen atom, a sulfur atom, or a nitrogen atom.

[0412]The others which are a phenylene group, a biphenylene machine, etc. similarly as a divalent substituent of an aromatic series system, The ether by which the methylene machine etc. with which such an aromatic series machine serves as alkylene machines, such as methylene and ethylene, and said frame were replaced with the hetero atom, It may be the basis connected via an ether bond, a thioether bond, an imino group, etc., respectively with the alkylene machine containing a thioether group etc. or the oxygen atom, the sulfur atom, the nitrogen atom, etc. [ two or more ]

[0413]A desirable thing is a compound denoted by a general formula (B11-2) among the cyclo fan compounds shown by said general formula (B11-1).

[0414]In a general formula (B11-2),  $R_1 - R_8$  express a hydrogen atom or a substituent, and, [ as a substituent ] an alkyl group (a methyl group, an ethyl group, i-propyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, aryl groups (a phenyl group and a naphthyl group.), such as a cyclohexyl group and a benzyl group p-trill machine, p-chlorophenyl machine, a pyrrole group, a pyridyl group, a benzimidazolyl machine, A benzothiazolyl machine, a benzoxazolyl machine, a triazolyl machine, an oxadiazolyl machine, alkenyl groups (a vinyl group.), such as a thiadiazolyl machine, a thienyl group, and a carbazolyl machine alkynyl groups (ethynyl group etc.) and alkyloxy machines (a methoxy group.), such as a propenyl machine and a styryl machine Aryloxy groups, such as an ethoxy basis, i-propoxy group, and a butoxy machine (phenoxy group etc.), An alkylthio group (a methylthio group, an ethyl thio group, i-pro PIRUKIO machine, etc.), arylthio groups (phenylthio group etc.), an amino group, an alkylamino group, arylamino machines (a dimethylamino group, a diethylamino machine, an ethyl methylamino machine, etc.) (an ANIRINO machine, a diphenylamino machine, etc.), and a halogen atom (a fluorine atom and a chlorine atom.) A cyano group, a nitro group and non-aromatic compound nature heterocyclic machines (a pyrrolidyl machine, a pyrazolyl machine, an imidazolyl group, etc.), such as a bromine atom and an iodine atom, silyl groups (a trimethylsilyl machine, t-butyl dimethylsilyl group, a dimethylphenyl silyl group, a bird phenyl silyl group, etc.), etc. are mentioned. Each substituent may have a substituent further. For example, it adjoins, bases, such as  $R_1$  and  $R_2$ ,  $R_3$  and  $R_4$ ,  $R_5$  and  $R_6$ ,  $R_7$ , and  $R_8$ , may connect, and they may form the ring.

[0415]In this, an aryl group, an alkenyl group, and an alkynyl group are mentioned as a desirable thing.

[0416]Although it is synonymous with what was explained by said  $R_1 - R_8$  as a substituent although  $R_9 - R_{16}$  expressed the hydrogen atom or the substituent, it is a hydrogen atom preferably.

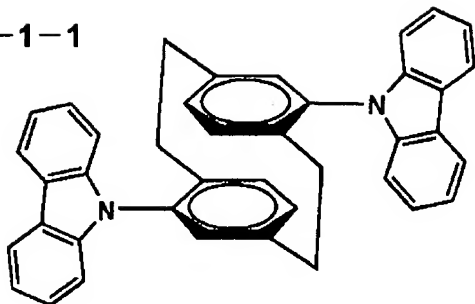
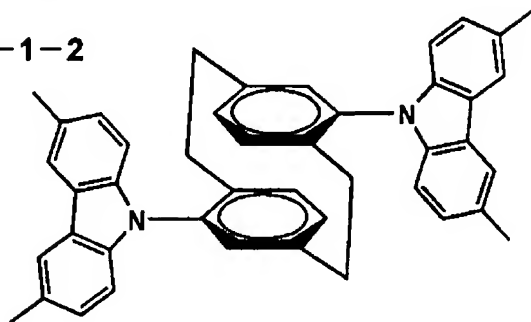
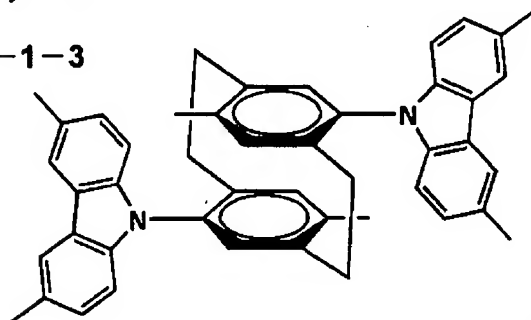
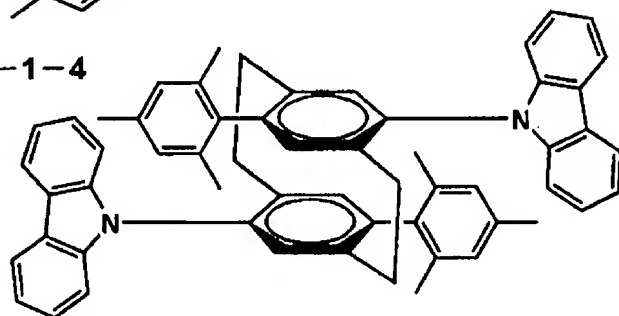
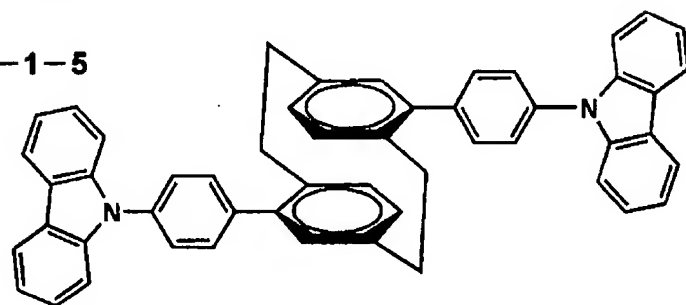
[0417]In a general formula (B11-3), although Ra, Rb, Rc, and Rd express a hydrogen atom or a substituent, this substituent is synonymous with what was explained by said  $R_1 - R_8$ , and its desirable substituent is also the same.

[0418]Although the example of a compound denoted by a general formula (B11-1), (B11-2), and (B11-3) below is shown, the cyclo fan compound in this invention is not limited to these.

[0419]

[Chemical formula 308]

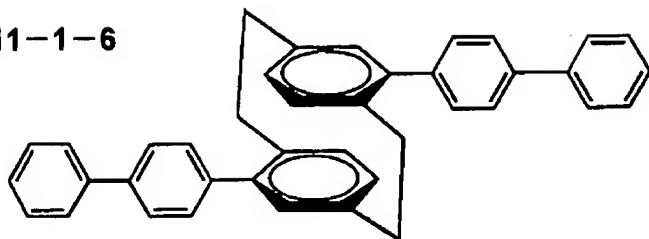


**B11-1-1****B11-1-2****B11-1-3****B11-1-4****B11-1-5**

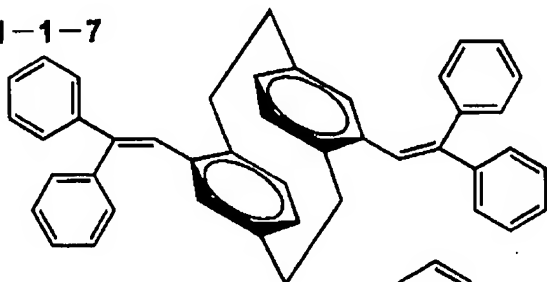
[0420]

[Chemical formula 309]

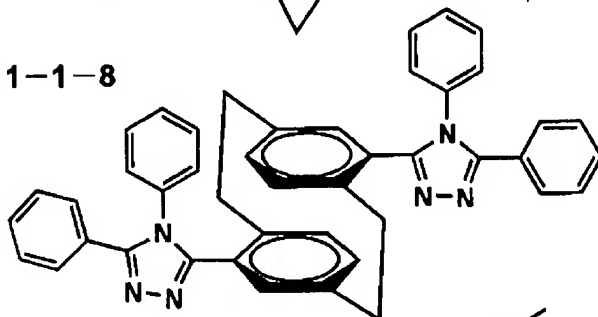
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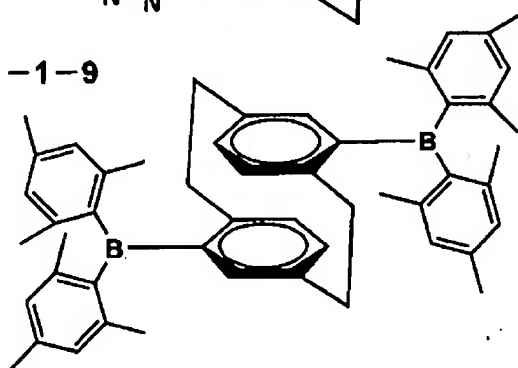
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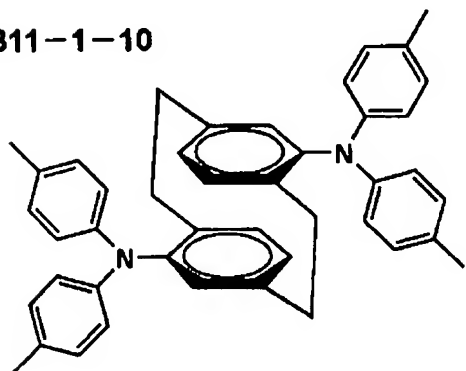
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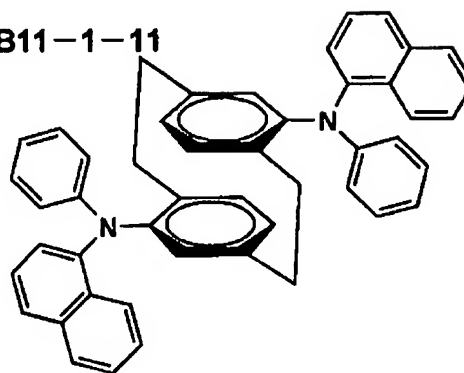
B11-1-9



B11-1-10



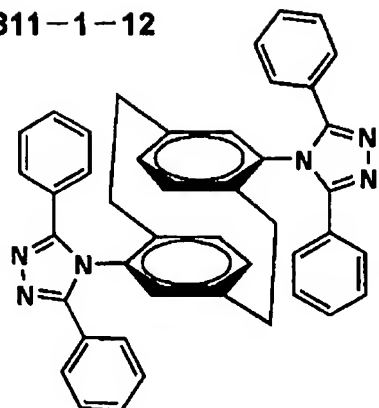
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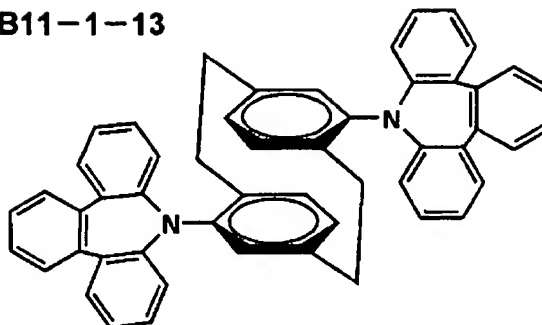
[0421]

[Chemical formula 310]

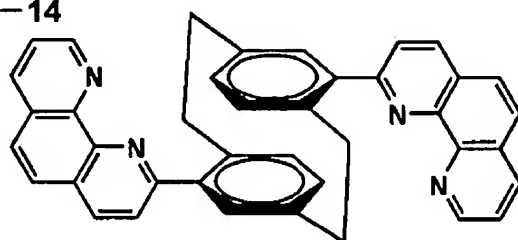
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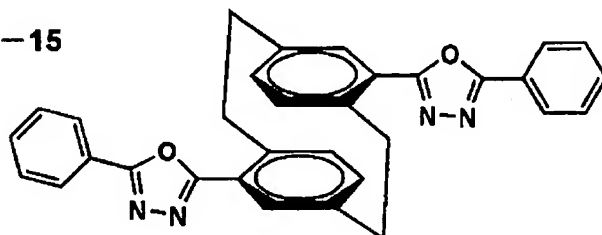
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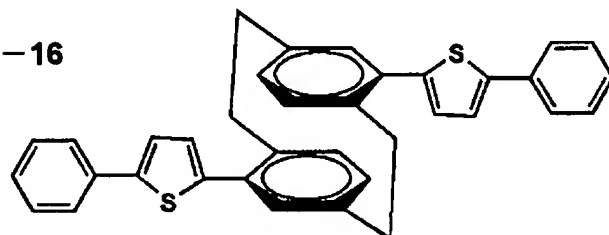
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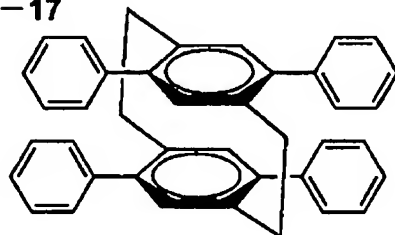
B11-1-15



B11-1-16



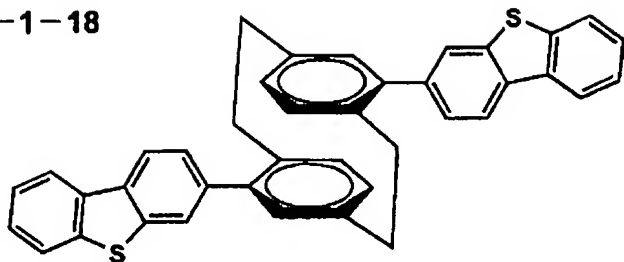
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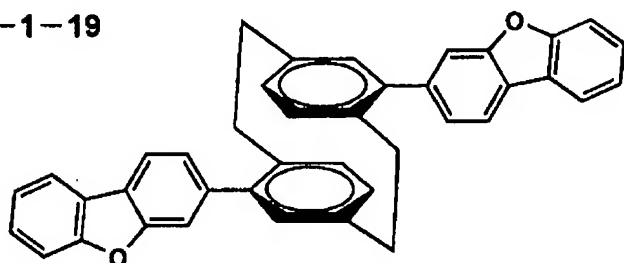
[0422]

[Chemical formula 311]

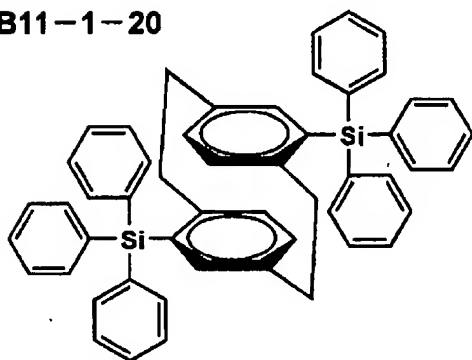
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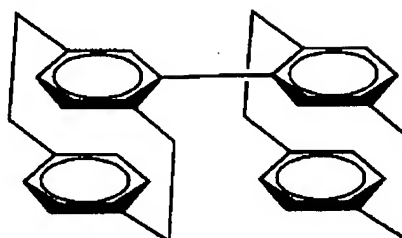
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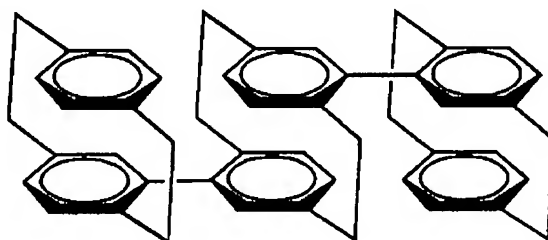
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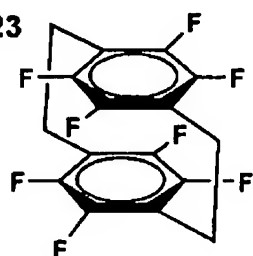
B11-1-21



B11-1-22



B11-1-23

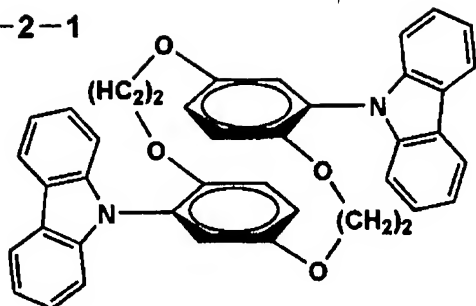


[0423]

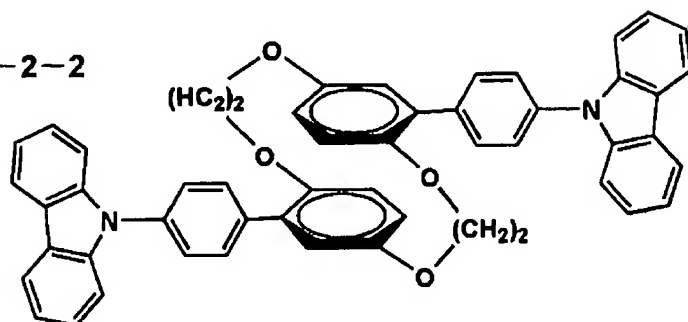
[Chemical formula 312]



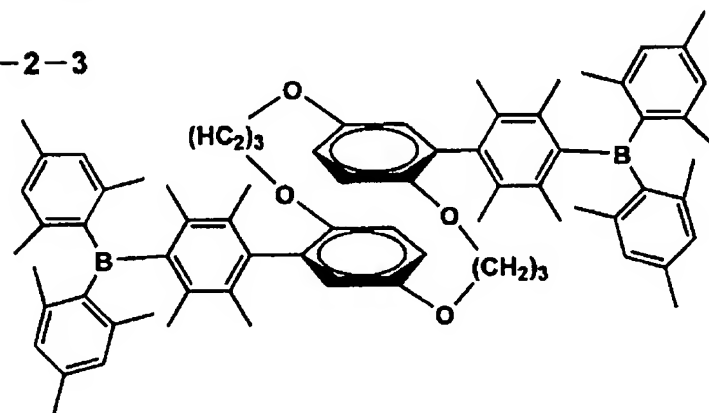
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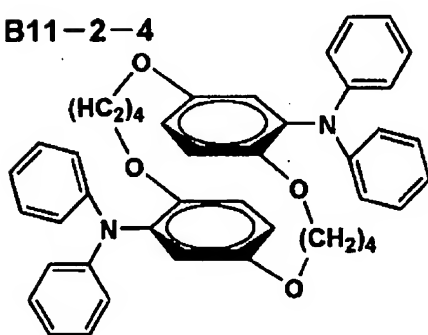
B11-2-2



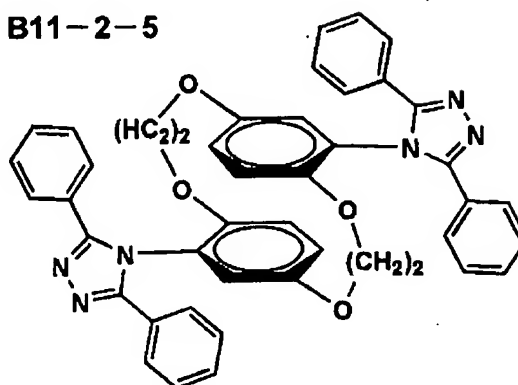
B11-2-3



B11-2-4

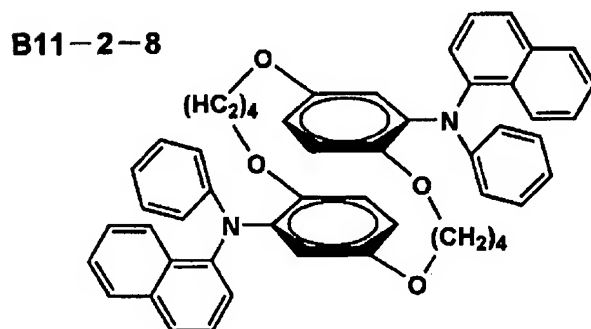
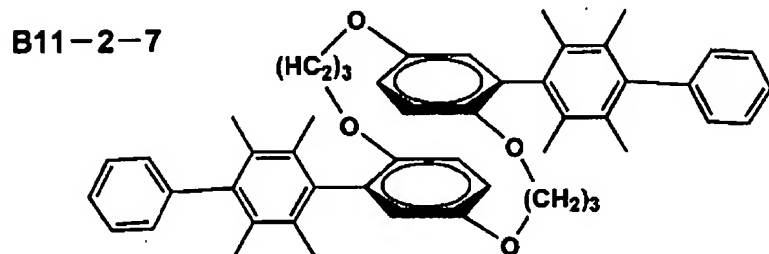
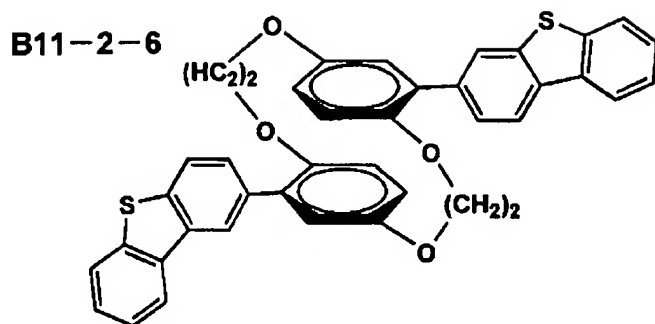


B11-2-5



[0424]

[Chemical formula 313]



[0425]

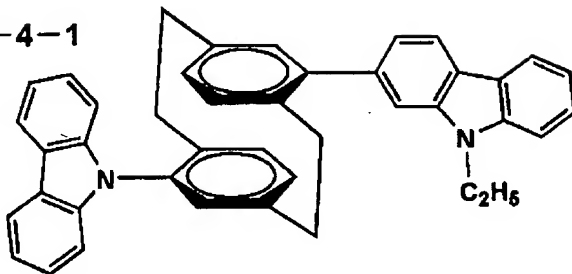
[Chemical formula 314]



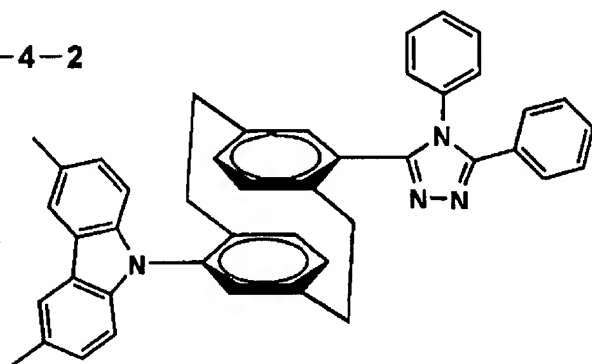
[0426]

[Chemical formula 315]

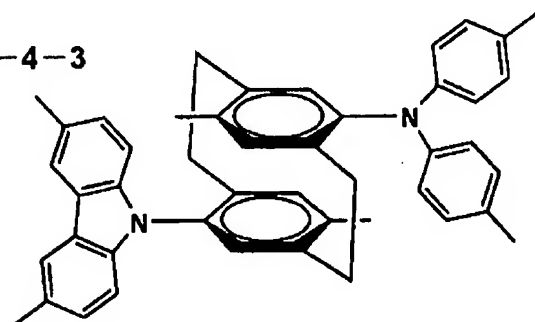
B11-4-1



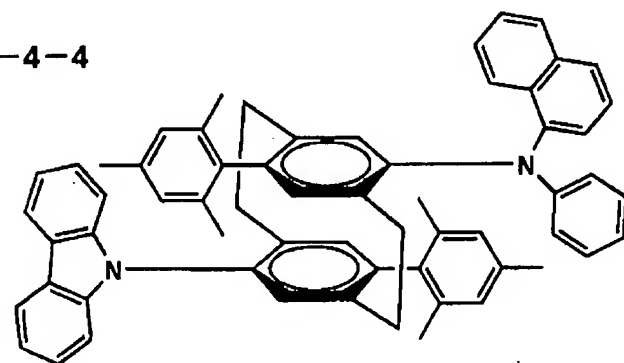
B11-4-2



B11-4-3



B11-4-4

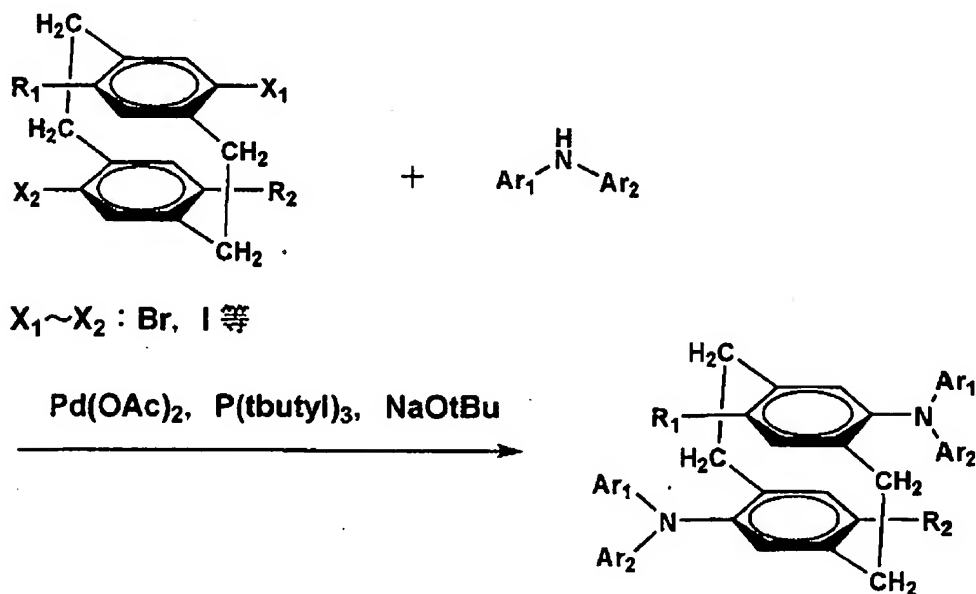


[0427] These cyclo fan compounds can be easily compounded by a publicly known method, and can be obtained by comparatively good \*\*\*\* according to the synthetic pathway generally shown below.

[0428] (Synthetic example) When a substitution amino group is introduced into a cyclo fan

[0429]

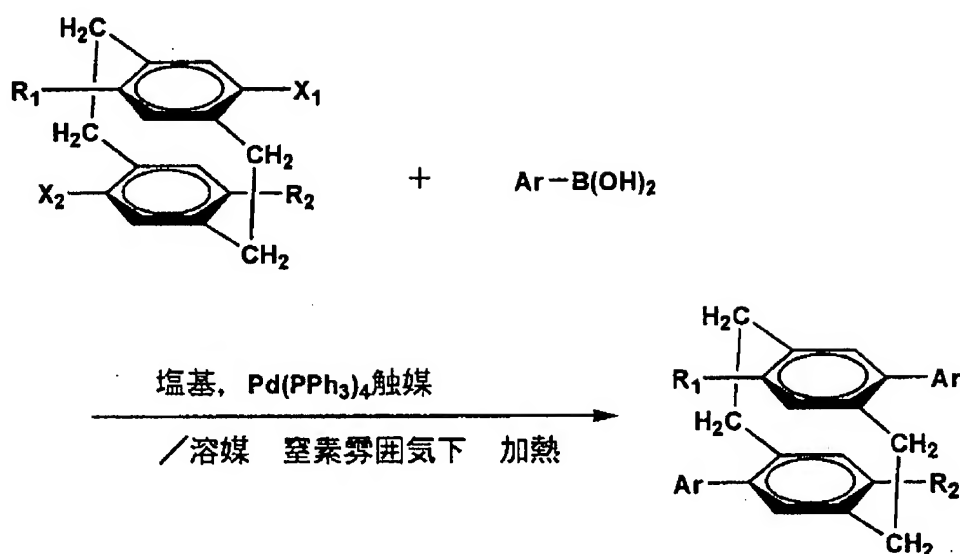
[Chemical formula 316]



[0430] (Synthetic example 2) When a substitution aryl group is introduced into a cyclo fan

[0431]

[Chemical formula 317]



[0432]The above synthesizing method is a general thing indicated also in following document.

[0433]M. Nishiyama et al., Tetrahedron Lett.39 (1998), Synthetic method of 2367-2370 JP,316360,B (JP) ARIRU amine TOSOH Nishiyama J(filing date 97.4.15 priority date 96.4.19).F.Hartwig, Angew.Chem.Ind.Ed.37 (1998), 2046-2067M. Nishiyama et al., Tetrahedron Lett.41 (2000), 481-484N. Miyaura et al., Synth.Comm.11 (7) and (1981), and 513-519 -- as for the molecular weight of these compounds, it is preferred again that it is 300-2000. Tg (glass transition temperature) goes up that molecular weights are 300-2000, heat

stability improves, and an element life is improved. More desirable molecular weights are 500-2000.

[0434]\*\* et al. [ however, ] -- \*\* -- it may be polymer which contains a compound as a part of repeat unit -- in that case -- the above -- it does not matter even if it deviates from a desirable molecular weight.

[0435]Next, the compound shown in a general formula (C1-1-1) - a general formula (C1-8-2) is explained. Although the compound containing OREFIN can be in this invention and can be used as a host compound into a molecule, it is a compound preferably shown in a general formula (C1-1-1) - a general formula (C1-8-2).

[0436] $R_1$ ,  $R_2$ ,  $R_3$ , and  $R_4$  express a hydrogen atom, an alkyl group, an alkoxy group, an aryl group, a heterocyclic machine, or a cyano group among a general formula (C1-1-1).

[0437]As an alkyl group, there are a methyl group, an ethyl group, an isopropyl group, a hydroxyethyl machine, a methoxymethyl machine, a trifluoromethyl group, a perfluoro propyl group, a perfluoro n-butyl group, a perfluoro t-butyl group, t-butyl group, a benzyl group, etc., for example.

[0438]As an alkoxy group, there are a methoxy group, an ethoxy basis, an isopropoxy group, a butoxy machine, etc., for example.

[0439]As an aryl group, there are a phenyl group, a naphthyl group, a p-trill machine, a p-chlorophenyl machine, etc., for example.

[0440]As a heterocyclic machine, there are a pyrrolyl machine, a pyrrolidyl machine, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a triazolyl machine, a benzimidazolyl machine, a benzothiazolyl machine, a benzoxazolyl machine, a frill machine, a thienyl group, a thiazolyl machine, etc.



[0441] These bases may be replaced further and, [ as a substituent ] A halogen atom, a hydroxyl machine, a nitro group, a cyano group, a carboxyl group, A sulfonic group, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, An alkylthio group, an arylthio group, an ARUKIRU sulfonyl group, an ARIRU sulfonyl group, An alkoxy carbonyl group, an aryloxy carbonyl group, an acyl group, a reed RUOKISHI machine, an amino group, a KARUBON amide machine, a sulfonamide group, a carbamoyl group, a sulfamoyl group, a UREIDO machine, an alkoxy carbonylamino machine, a sulfamoylamino group, etc. are mentioned.

[0442] Among a general formula (C1-1-1) and at least 1 of  $R_1$ ,  $R_2$ ,  $R_3$ , and  $R_4$  are an aryl group or a heterocyclic machine.

[0443] Preferably, two of  $R_1$ ,  $R_2$ ,  $R_3$ , and  $R_4$  are an aryl group or a time of being an aryl group altogether.

[0444]  $X_1$  and  $X_2$  express an aryl group or a heterocyclic machine among a general formula (C1-1-2), and  $R_5$  and  $R_6$  express an aryl group, a heterocyclic machine, or the residue of alicyclic hydrocarbon, and  $R_6$  either one of  $R_5$  or expresses the residue of alicyclic hydrocarbon.

$R_5$  and  $R_6$  may form an alicyclic ring. There are residues, such as a cycloalkyl machine and a cycloalkenyl group, as a residue of alicyclic hydrocarbon. As a residue of alicyclic hydrocarbon, they are cycloalkyl machines (for example, a cyclopentyl group, a cyclohexyl group, etc.) especially preferably. These bases may be replaced further.

[0445]  $X_3$  and  $X_4$  among a general formula (C1-1-3) An aryl group, Express a heterocyclic machine and  $R_7$  and  $R_8$  Or an aryl group, a heterocyclic machine, an aryloxy group, an alkylthio group, an arylthio group, Or a halogen atom is expressed and  $R_8$  either one of  $R_7$  or expresses an aryloxy group, an alkylthio group, an arylthio group, or a halogen atom. As a halogen atom, there are a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc. Preferably, it is a fluorine atom.

[0446]  $R_9$ ,  $R_{10}$ ,  $R_{11}$ , and  $R_{12}$  express a hydrogen atom or a substituent among a general formula (C1-2-1), and at least one substituent of  $R_9$ ,  $R_{10}$ ,  $R_{11}$ , and  $R_{12}$  is denoted by the following general formula (C1-2-2).

[0447] General formula (C1-2-2) \*  $A_{20}$  and  $A_{21}$  express the aromatic series ring of a monocycle, or heterocycle among a  $_{20}-A_{21}-R_{20}$  type,  $R_{20}$  expresses a hydrogen atom or a substituent, and \* expresses a binding site.

[0448]  $A_{51}$ ,  $A_{52}$ ,  $A_{53}$ , and  $A_{54}$  express the aromatic series ring of a monocycle, or heterocycle independently, respectively among a general formula (C1-2-2) and (C1-2-3)  $A_{20}$ ,  $A_{21}$ ,  $A_{22}$ ,  $A_{23}$ ,  $A_{24}$ ,  $A_{25}$ , and a general formula (5). as the aromatic series ring or the heterocyclic example of a monocycle -- benzene, a franc, CHIOFEN, pyrrole, OKISAZORU, imidazole, thia ZORU, and doria -- ZORU, pyridine, PIRIDAJIN, pyrimidine, pyrazine, triazine, etc. are mentioned.

[0449]  $R_{24\text{from } R_{21}}$  is a hydrogen atom or a substituent.

[ as a substituent denoted by  $R_{24\text{from } R_{21}}$  ] an alkyl group (for example, a methyl group, an ethyl group, an isopropyl group, and a hydroxyethyl machine.). A methoxymethyl machine, a trifluoromethyl group, a perfluoro propyl group, A perfluoro n-butyl group, a perfluoro t-butyl group, t-butyl group, Cycloalkyl machines, such as a benzyl group (for example, a cyclopentyl group, a cyclohexyl group, etc.), aralkyl groups (for example, a benzyl group, 2-FENECHIRU machine, etc.) and an aryl group (for example, a phenyl group.). A naphthyl group, p-trill machine, p-chlorophenyl machine, a fluorenyl group, etc., An alkoxy group (for example, an ethoxy basis, an isopropoxy group, a butoxy machine, etc.), aryloxy groups (for example, phenoxy group etc.), a hydroxyl machine, and an amino group (a dimethylamino group.). A diaryl amino group, alkenyl groups (for example, an allyl group, 1-ethenyl machine, 1-propenyl machine, 1-butenyl group, 1-octadecenyl machine, etc.), halogen atoms (a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc.), etc. are mentioned.

These bases may be replaced further and the thing quoted by the general formula (C1-1-1) is

mentioned as said substituent.

[0450]In a general formula (C1-2-3), when  $A_{22}$  and  $A_{23}$  are heterocycles, the case where a hetero atom is two or more pieces is preferred.

[0451]In a general formula (C1-3) and (C1-4),  $A_{31}$ ,  $A_{41}$ , and  $A_{42}$  express an aromatic series ring or heterocycle. These aromatic series rings or heterocycle is the basis which the aromatic series unit containing a monocycle machine, a condensed multi-ring machine, a monocycle, or condensed multi-ring connected. Specifically Benzene, toluene, NAFUTAREN, anthracene, phenanthrene, Full OREN, pyrene, PERIREN, triphenylene, AZUREN, a fluorenone, A franc, CHIOFEN, pyrrole, pyridine, OKISAZORU, pyrazine, pyrimidine, oxadiazole, and doria -- ZORU, Indore, and quinoline. the residue of the aromatic series ring which is not replaced [ substitution, such as iso quinoline, carbazole, AKURIJIN, benzothia ZORU, a phenanthro phosphorus, and cinchona bark KURIDON, or ] or a condensation aromatic ring -- further, Aromatic ring structure units, such as biphenyl, terphenyl, binaphthyl, bird phenyl benzene, diphenyl anthracene, rubrene, BIPIRIJIN, biquinoline, and bithiophene, are the residues connected directly.

[0452] $A_{41}$  and  $A_{42}$  have the most preferred case where a styryl machine or a substitution styryl machine is introduced as a substituent.

[0453]In a general formula (C1-6),  $A_{61}$  expresses an aromatic series ring machine or a heterocyclic machine. As an aromatic series ring machine, [ as a phenyl group, a naphthyl group an anthranil, a phenan thrill machine, a pyrenyl machine, the Collot Nils machine, a biphenyl machine, a terphenyl machine, and a heterocyclic machine ] A fluorenyl group, a furanyl machine, a thienyl group, a benzothienyl group, the India Lil machine, a carbazoly machine, a benzimidazolyl machine, a benzoxazolyl machine, an imidazolyl group, etc. are mentioned.

[0454]In a general formula (C1-5),  $A_{51}$ ,  $A_{52}$ ,  $A_{53}$ , and  $A_{54}$  express the aromatic series ring of a monocycle, or heterocycle, and  $R_{51}$ ,  $R_{52}$ ,  $R_{53}$ ,  $R_{54}$ ,  $R_{55}$ , and  $R_{56}$  express a hydrogen atom or

a substituent. As an aromatic series ring machine, [ as a phenyl group, a naphthyl group an anthranil, a phenan thrill machine, a pyrenyl machine, the Collot Nils machine, a biphenyl machine, a terphenyl machine and a heterocyclic machine ] A fluorenyl group, a furanyl machine, a thienyl group, a benzothienyl group, the India Lil machine, a carbazolyl machine, a benzimidazolyl machine, a benzoxazolyl machine, an imidazolyl group, etc. are mentioned.

[0455]In a general formula (C1-3), (C1-4), (C1-5), (C1-6), (C1-7), (C1-8-1), and (C1-8-2),  $R_{31}$ - $R_{36}$ ,  $R_{41}$ - $R_{48}$ ,  $R_{51}$ - $R_{56}$ ,  $R_{61}$ - $R_{63}$ ,  $R_{71}$ - $R_{76}$ ,  $R_{81}$  -  $R_{92}$  express a hydrogen atom or a substituent. When  $R_{31}$ - $R_{36}$ ,  $R_{41}$ - $R_{48}$ ,  $R_{51}$ - $R_{56}$ ,  $R_{61}$ - $R_{63}$ ,  $R_{71}$ - $R_{76}$ ,  $R_{81}$  -  $R_{92}$  are substituents, as the example, it is synonymous with the thing quoted in the general formula (C1-2-1) - (C1-2-3). When  $R_{35}$  and  $R_{36}$  express a substituent, preferably, it is the residue of alicycle system hydrocarbon, a halogen atom, an alkylthio group, an arylthio group, or an aryloxy group, and is a fluorine atom still more preferably.  $R_{41}$  and  $R_{42}$  have a preferred hydrogen atom. When  $R_{52}$  and  $R_{53}$  express a substituent, it is a fluorine atom preferably.

[0456]In a general formula (C1-8-1) and (C1-8-2),  $X_5$ ,  $X_6$ , and  $X_7$  express -O-, -S-, and -NRa-. Here, Ra is a substituent.  $Z_1$ ,  $Z_2$ , and  $Z_3$  are atomic groups required to form a condensed ring with a five-membered ring. Specifically, benzene, NAFUTAREN, anthracene, heterocycle, etc. are mentioned.

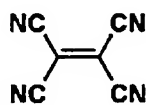
[0457]these host compounds concerning this invention -- as the partial structure in a molecule -- doria -- reel amine may be contained. When the aluminium complex like 5 \*\* is introduced into an electron transport layer about the life of an element, it is improved greatly and is desirable.

[0458]Although the example of a concrete compound is shown below, the host compound of this invention is not limited to these.

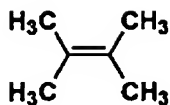
[0459]

[Chemical formula 318]

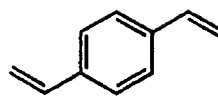
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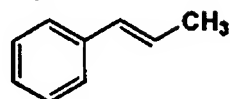
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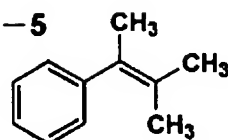
C1-1-3



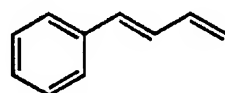
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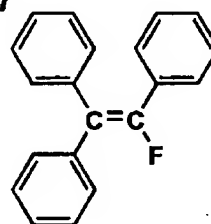
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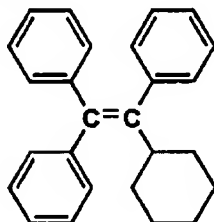
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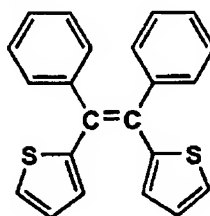
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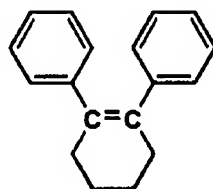
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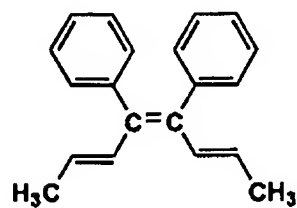
C1-1-9



C1-1-10

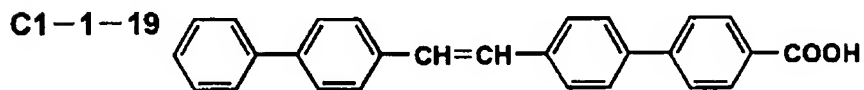
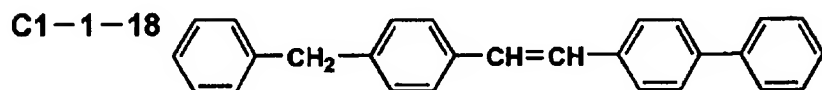
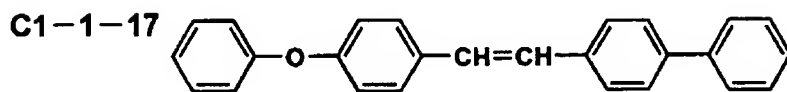
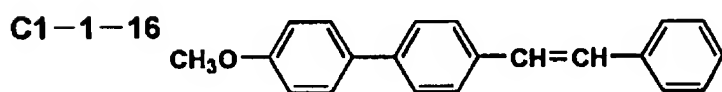
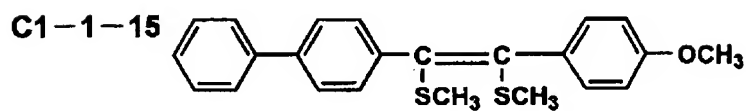
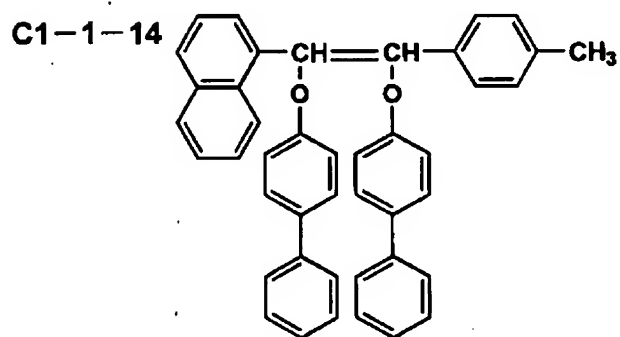
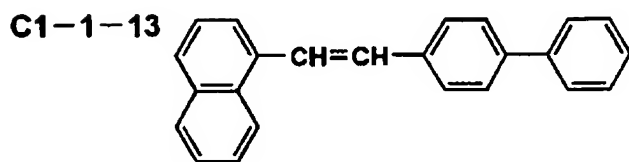
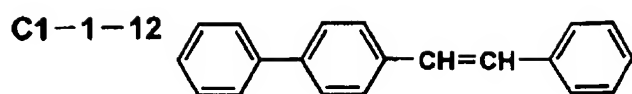


C1-1-11



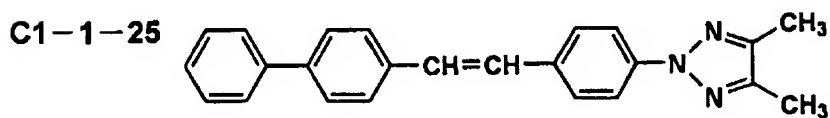
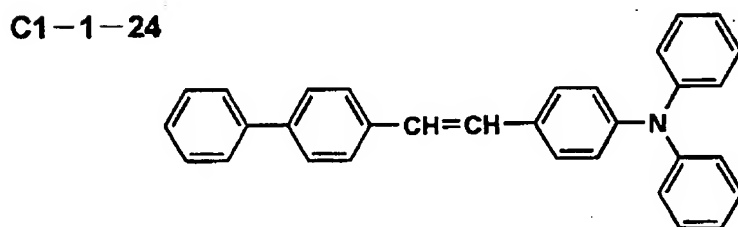
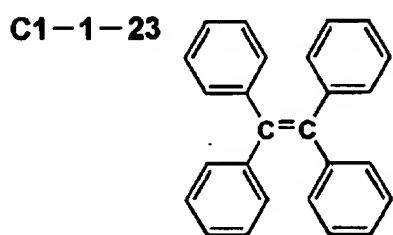
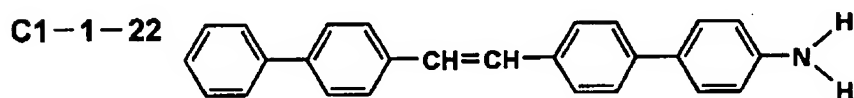
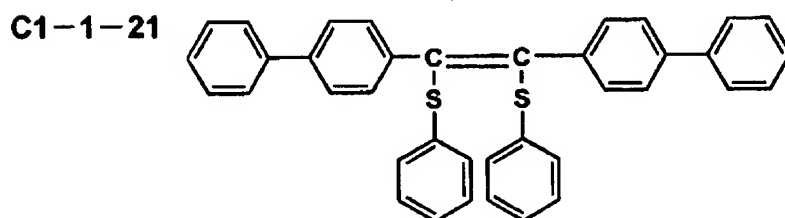
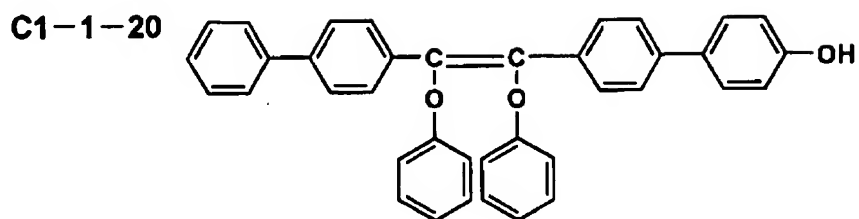
[0460]

[Chemical formula 319]



[0461]

[Chemical formula 320]

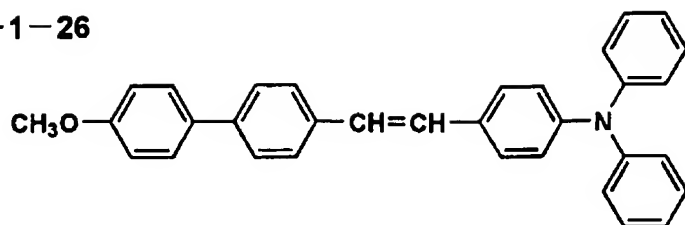




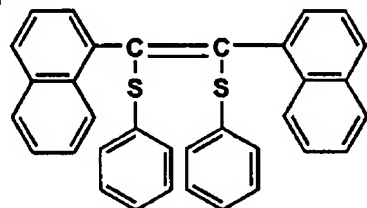
[0462]

[Chemical formula 321]

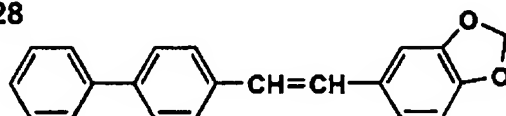
C1-1-26



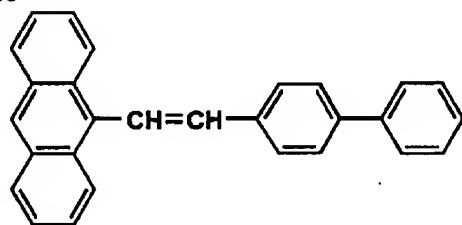
C1-1-27



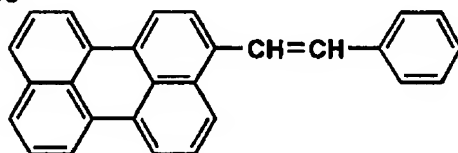
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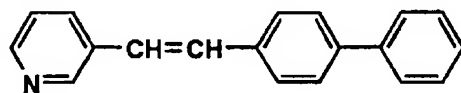
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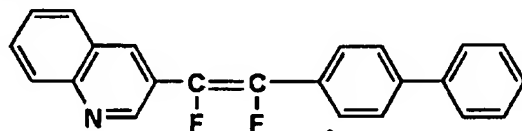
C1-1-30



C1-1-31



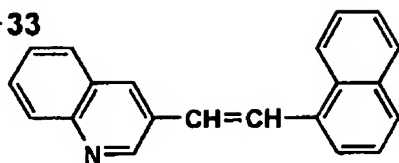
C1-1-32



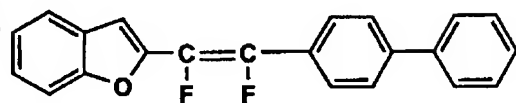
[0463]

[Chemical formula 322]

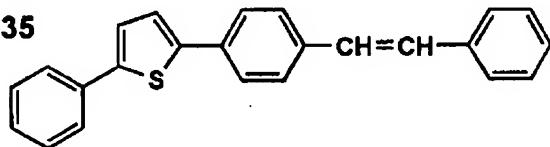
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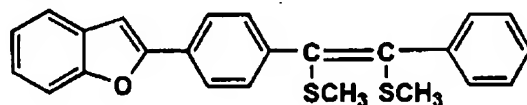
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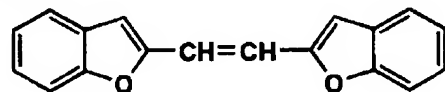
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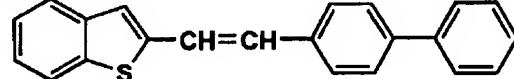
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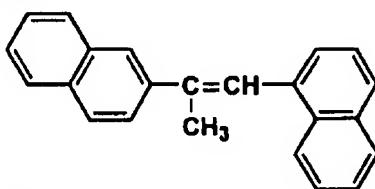
C1-1-37



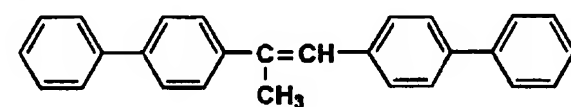
C1-1-38



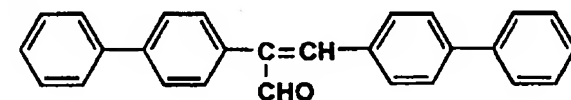
C1-1-39



C1-1-40

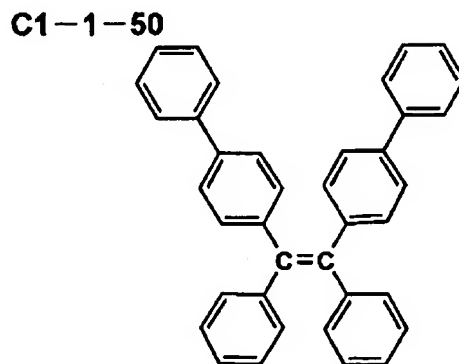


C1-1-41



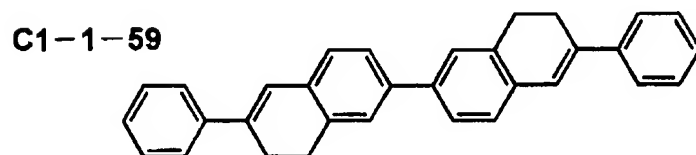
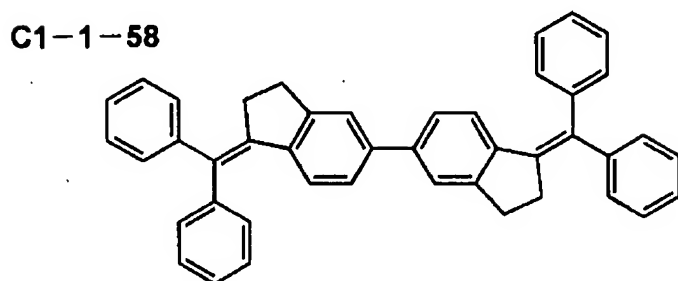
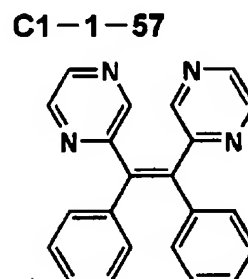
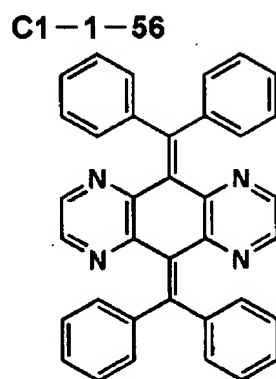
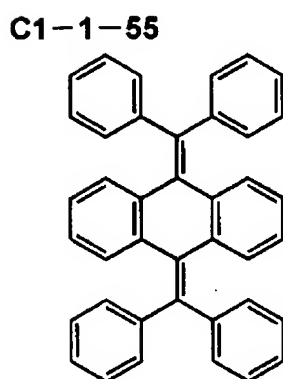
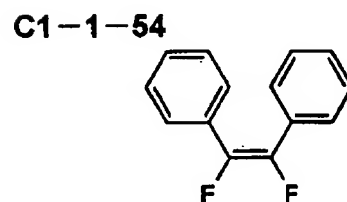
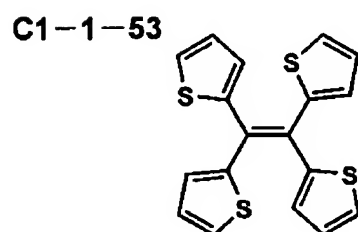
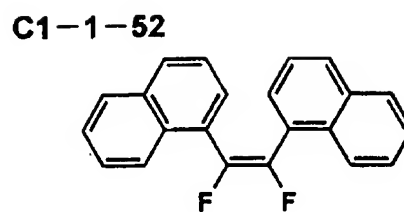
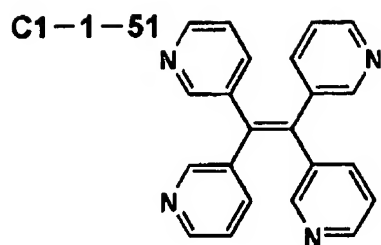
[0464]

[Chemical formula 323]



[0465]

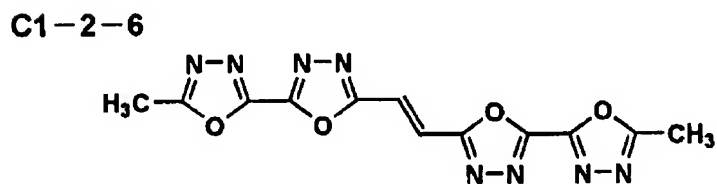
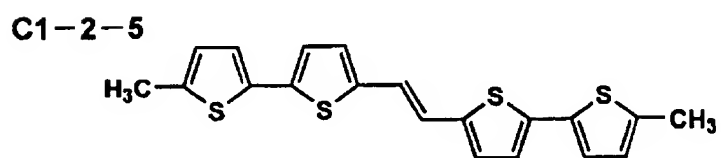
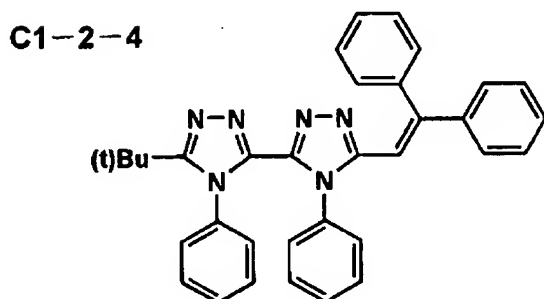
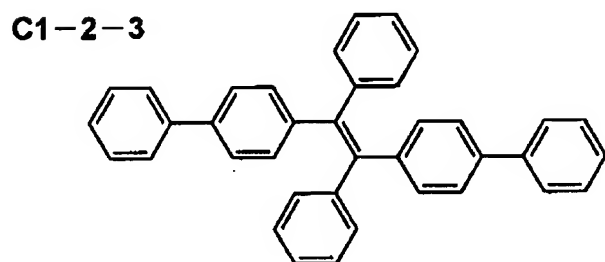
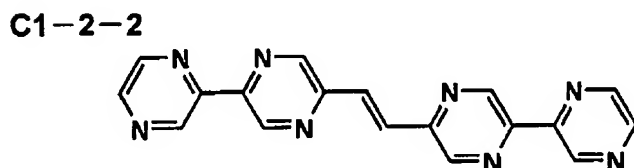
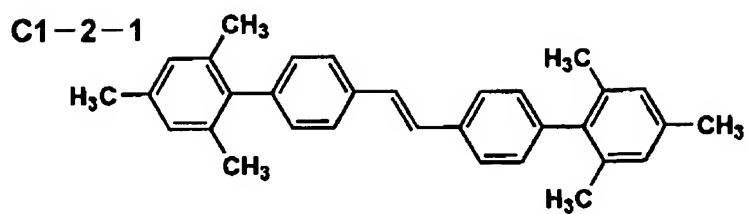
[Chemical formula 324]



[0466]

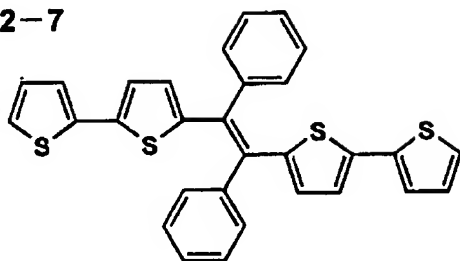
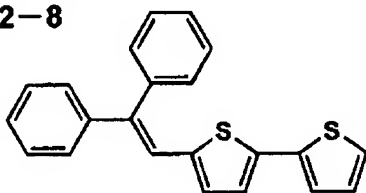
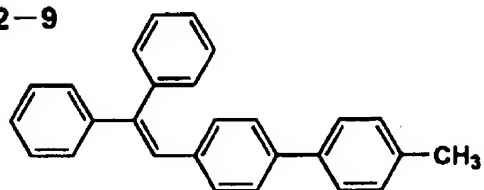
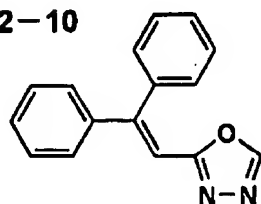
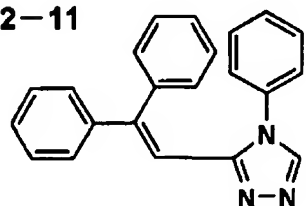


[Chemical formula 325]



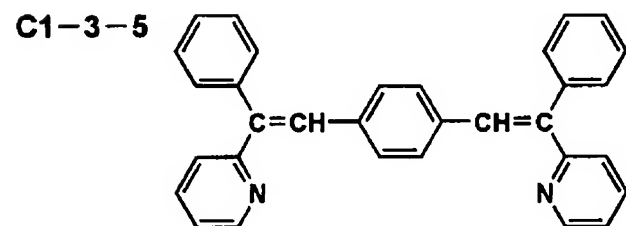
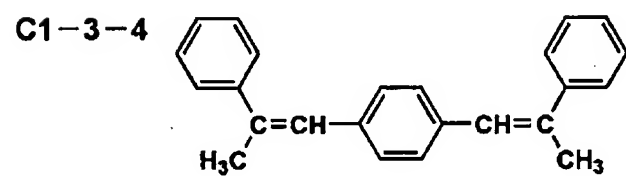
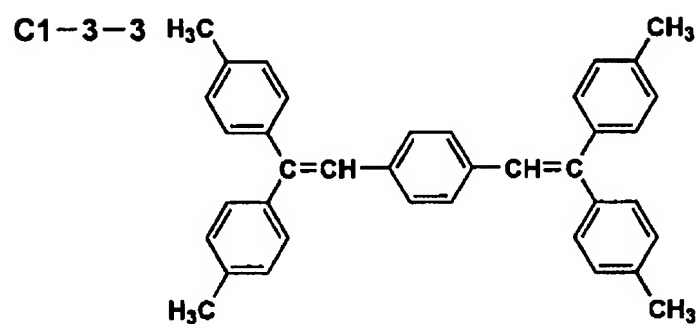
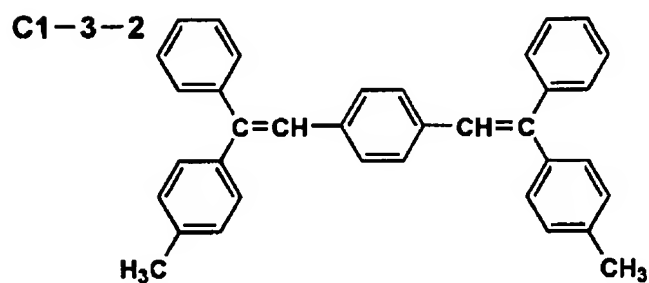
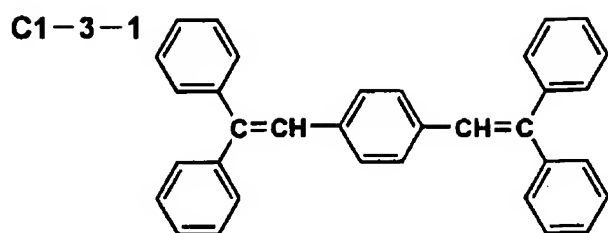
[0467]

[Chemical formula 326]

**C1-2-7****C1-2-8****C1-2-9****C1-2-10****C1-2-11**

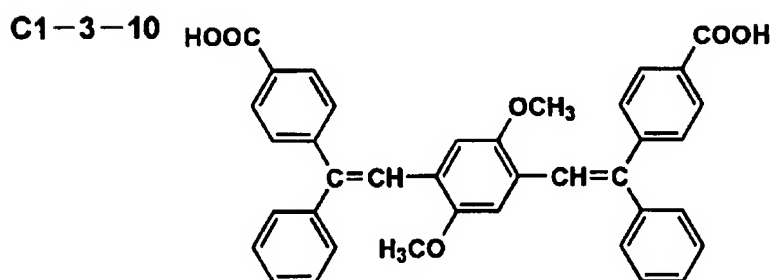
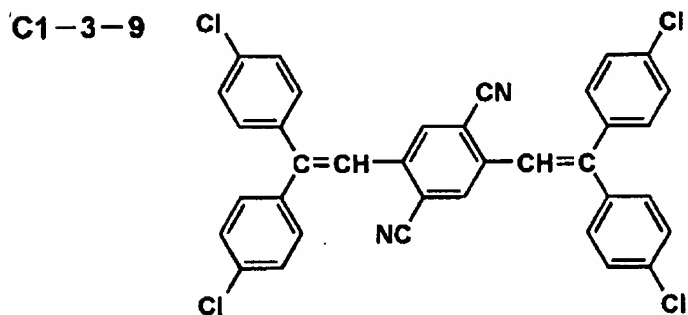
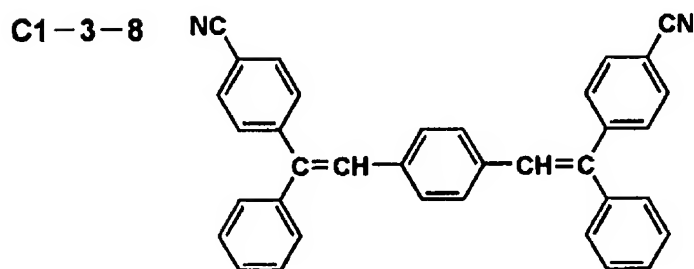
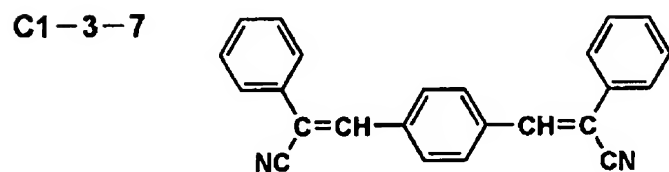
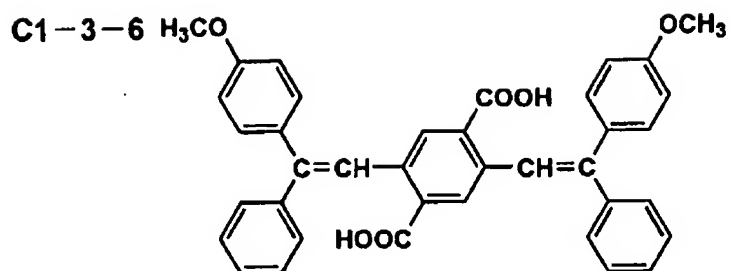
[0468]

[Chemical formula 327]



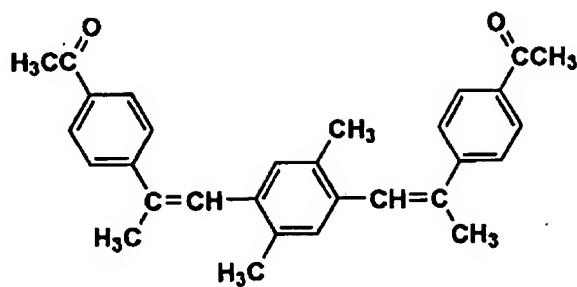
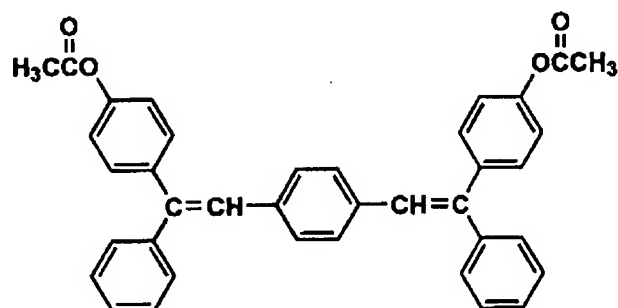
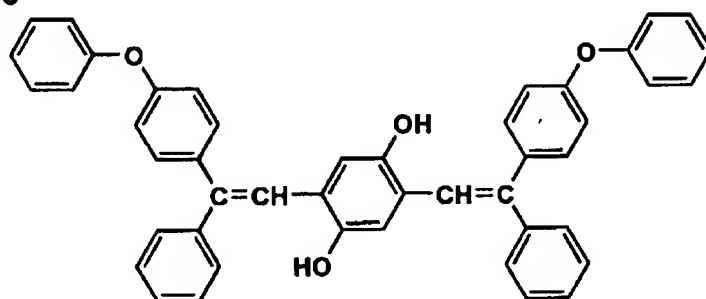
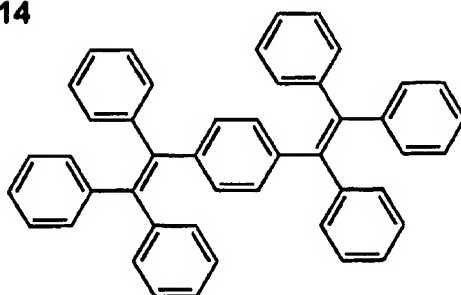
[0469]

[Chemical formula 328]



[0470]

[Chemical formula 329]

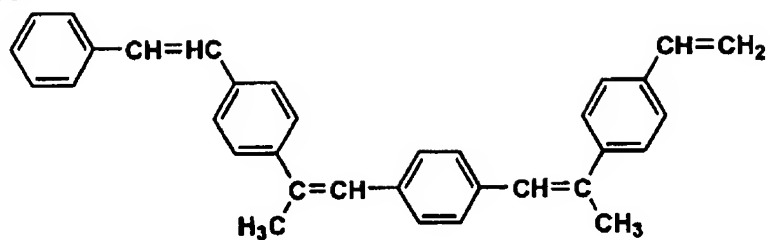
**C1-3-11****C1-3-12****C1-3-13****C1-3-14**



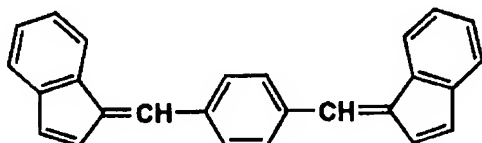
[0471]

[Chemical formula 330]

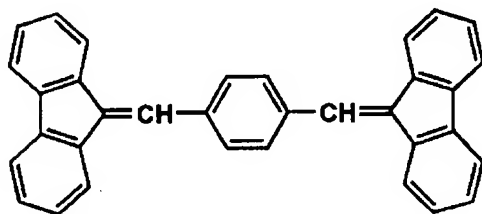
C1-3-15



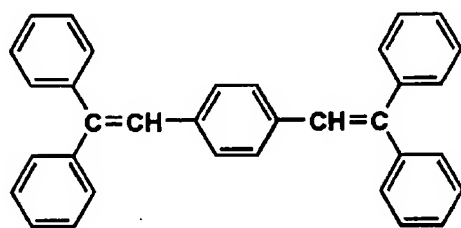
C1-3-16



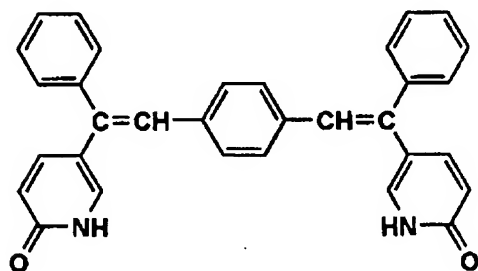
C1-3-17



C1-3-18



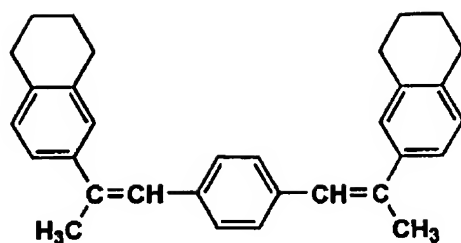
C1-3-19



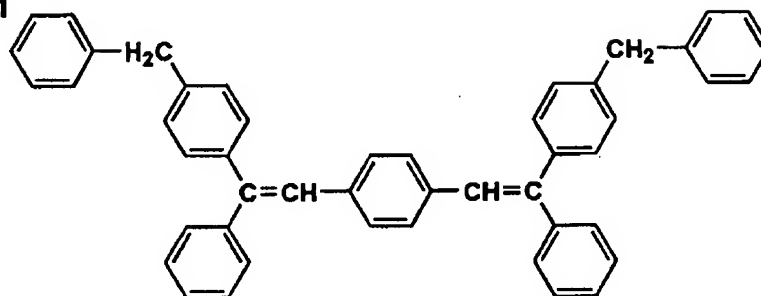
[0472]

[Chemical formula 331]

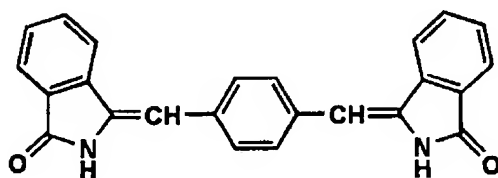
C1-3-20



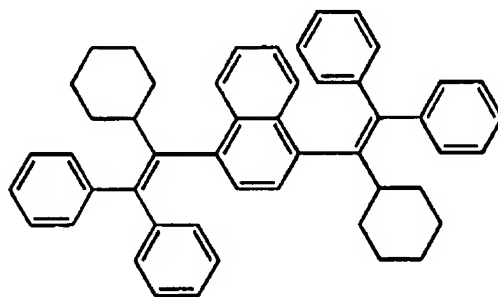
C1-3-21



C1-3-22

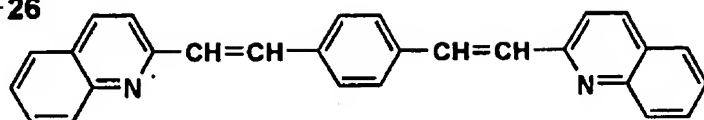
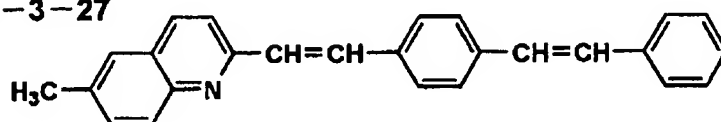
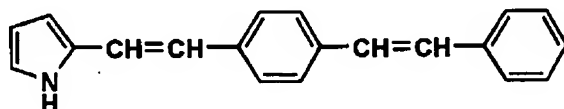
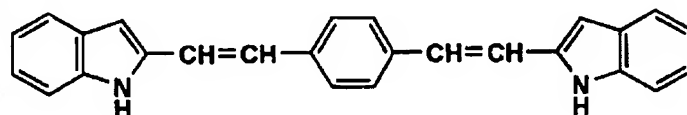
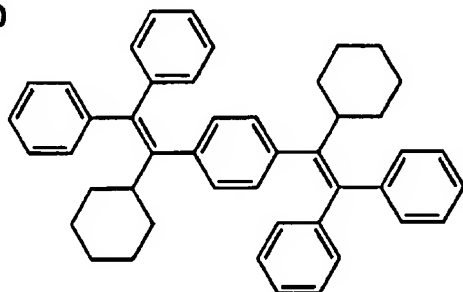
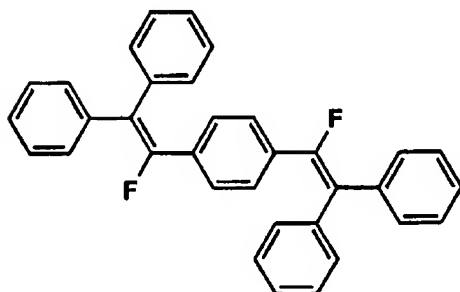
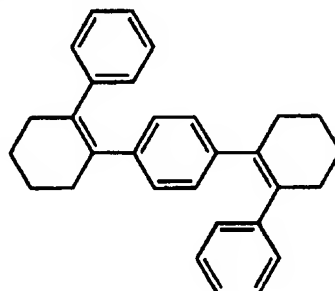


C1-3-23



[0473]

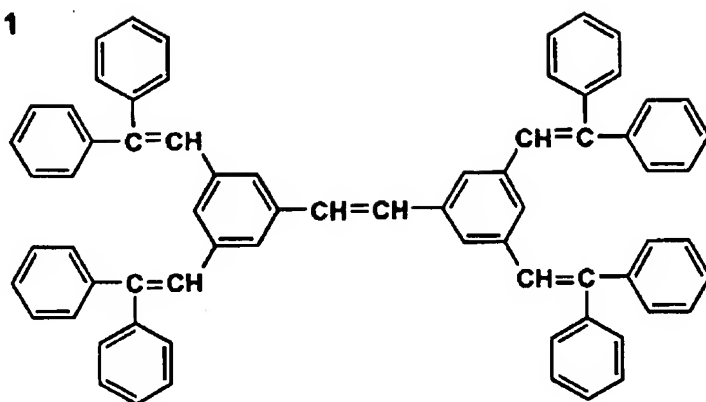
[Chemical formula 332]

**C1-3-26****C1-3-27****C1-3-28****C1-3-29****C1-3-30****C1-3-31****C1-3-32**

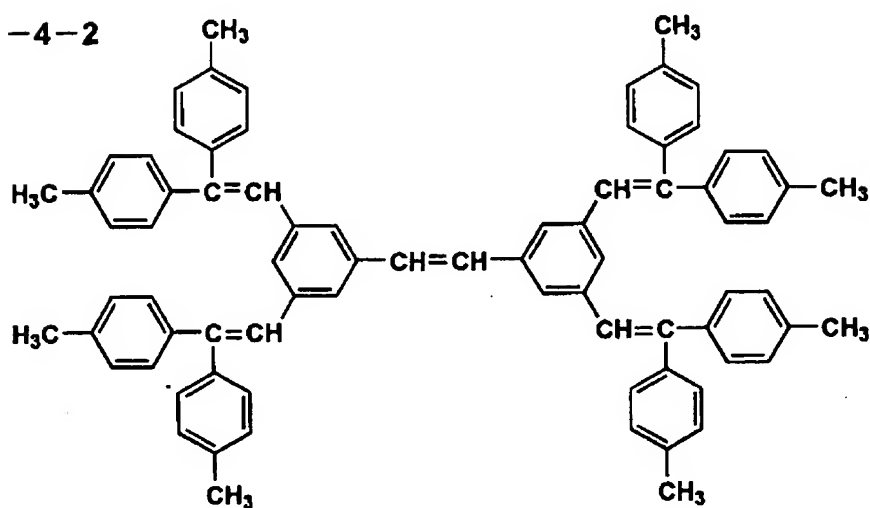
[0474]

[Chemical formula 333]

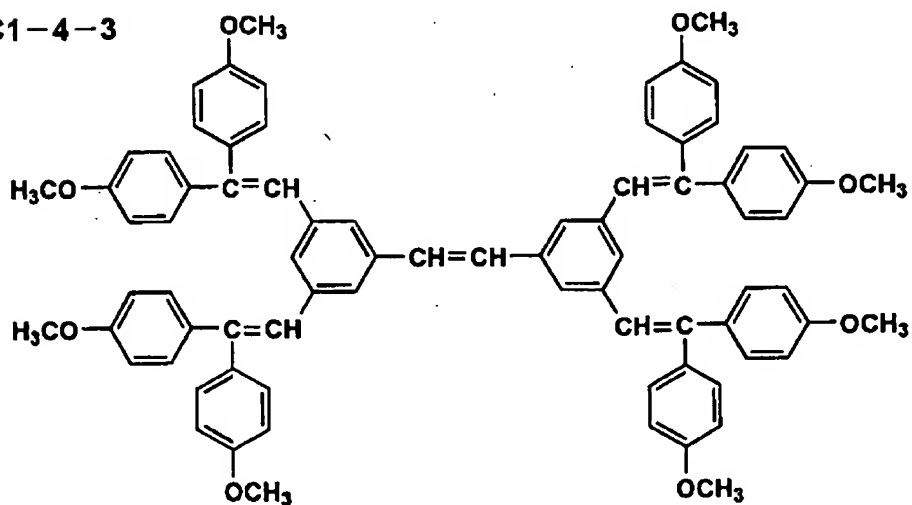
C1-4-1



C1-4-2

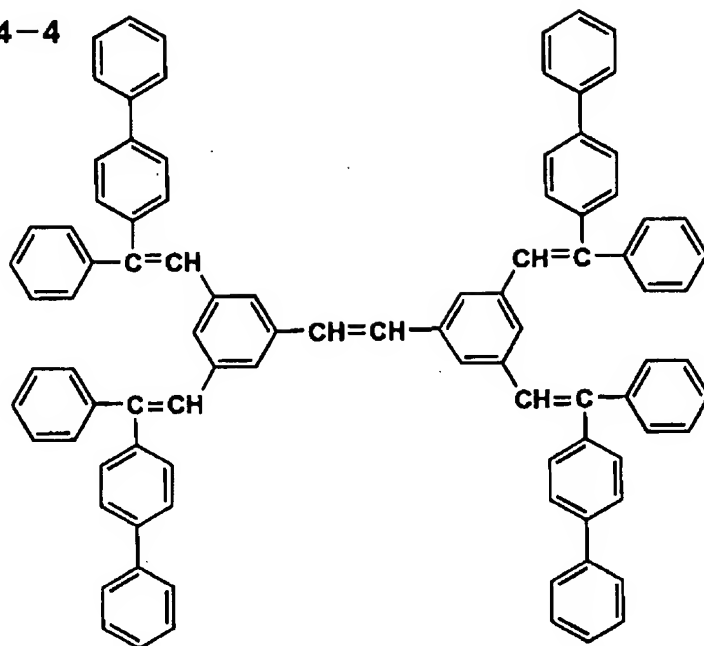
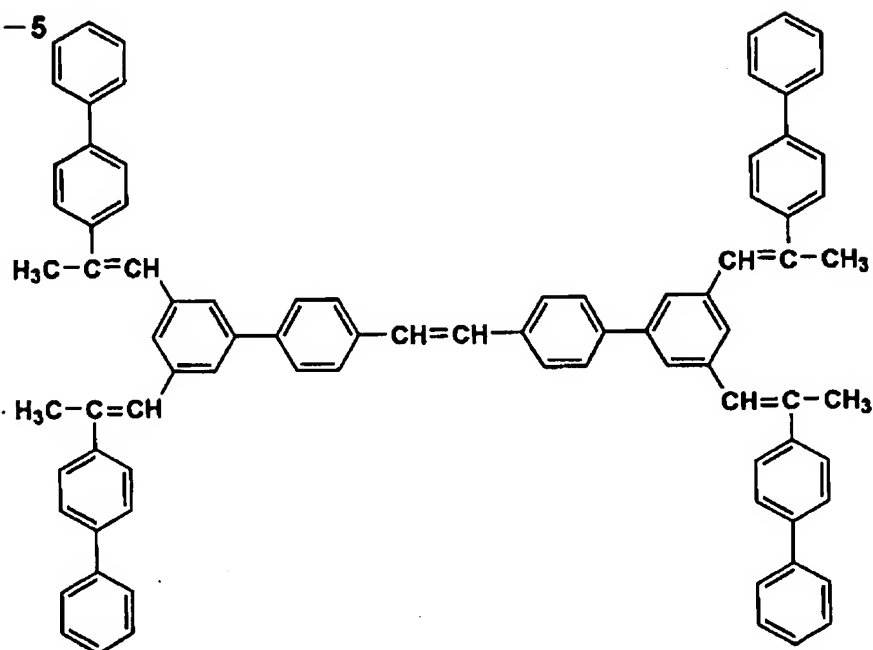


C1-4-3



[0475]

[Chemical formula 334]

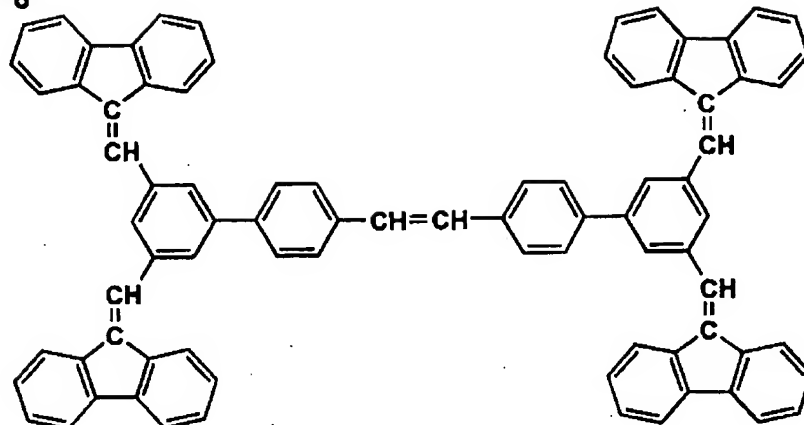
**C1-4-4****C1-4-5**



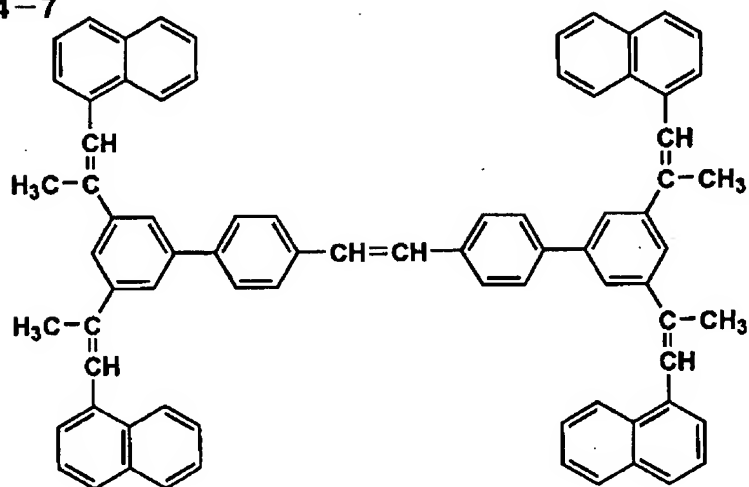
[0476]

[Chemical formula 335]

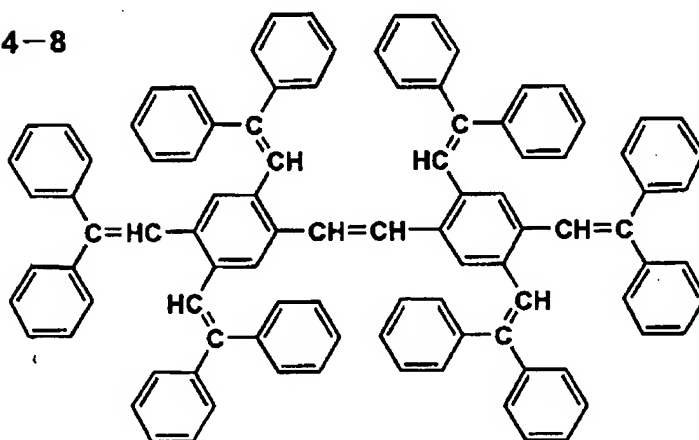
C1-4-6



C1-4-7



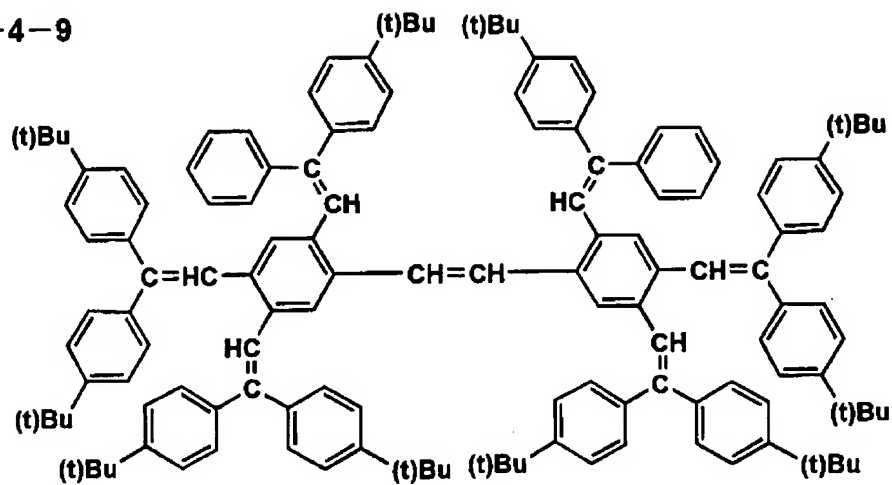
C1-4-8



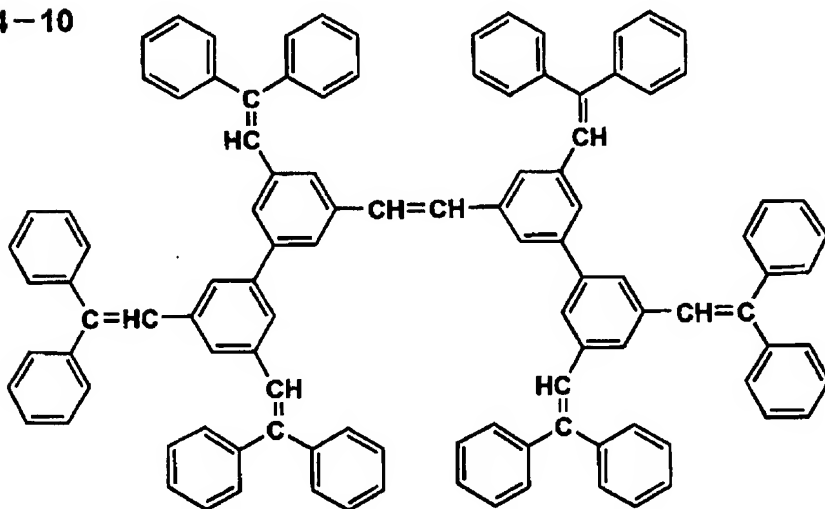
[0477]

[Chemical formula 336]

C1-4-9

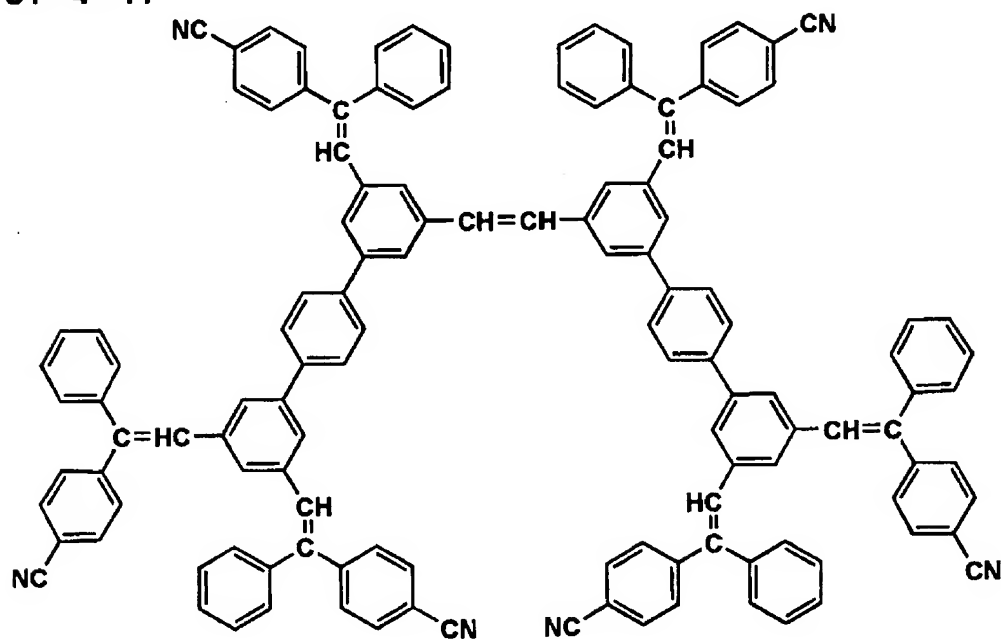
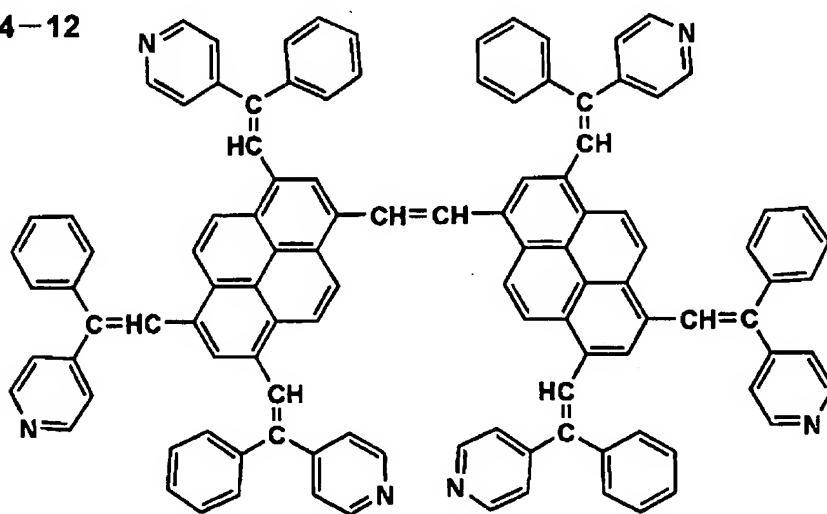


C1-4-10



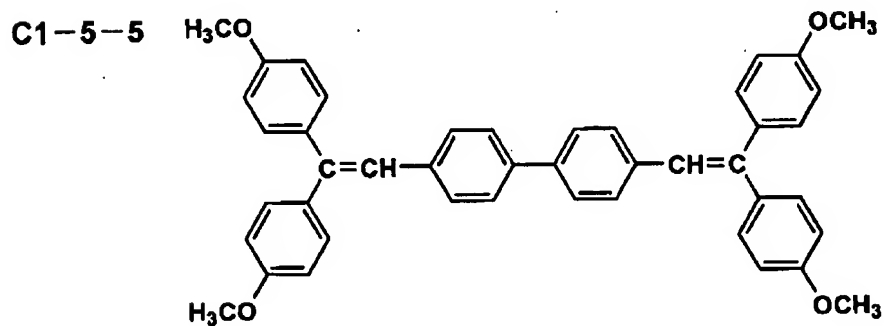
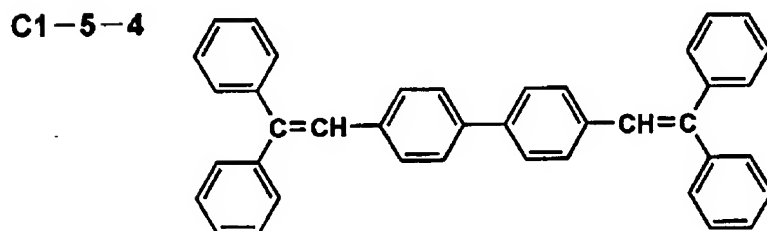
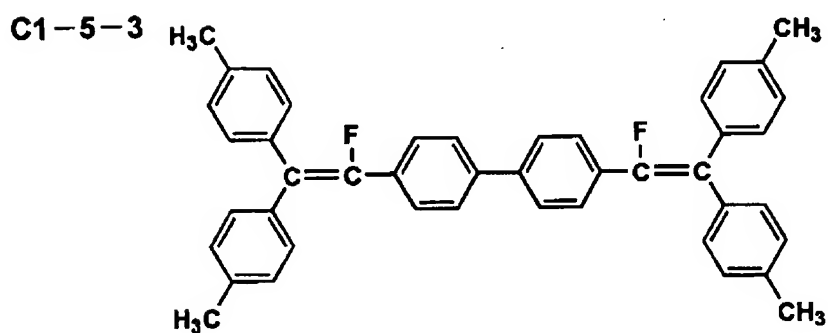
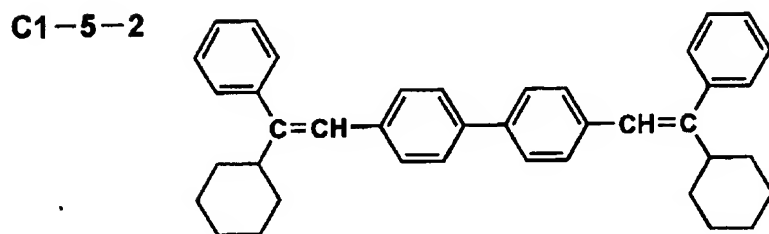
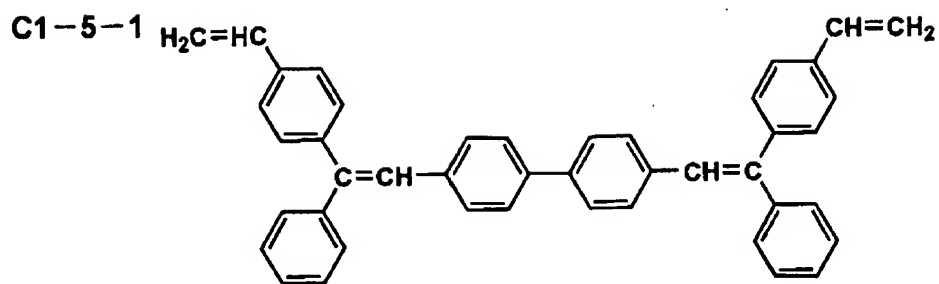
[0478]

[Chemical formula 337]

**C1-4-11****C1-4-12**

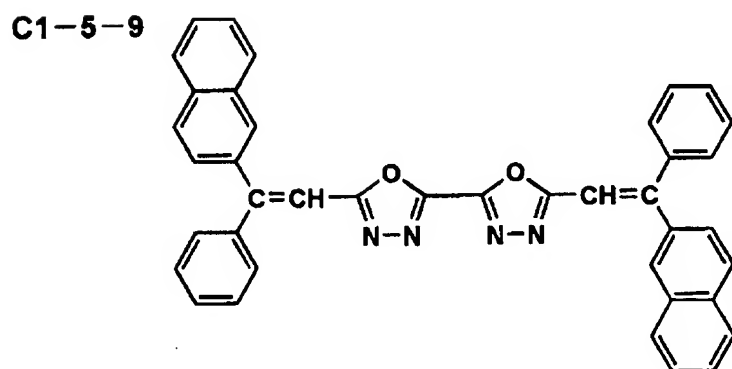
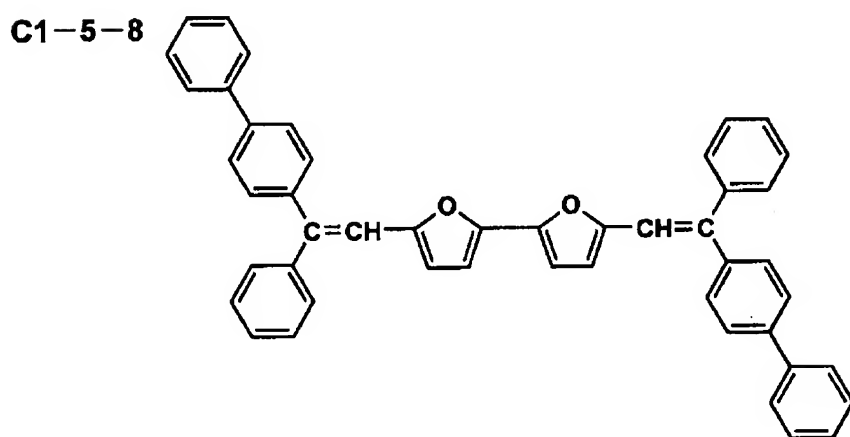
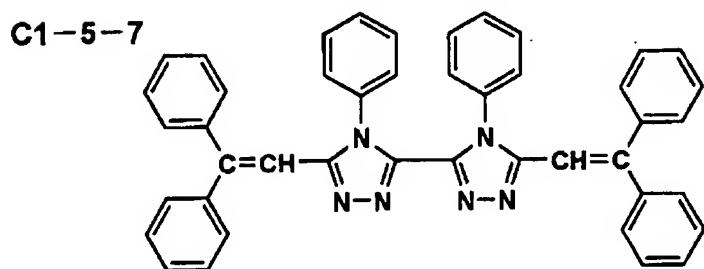
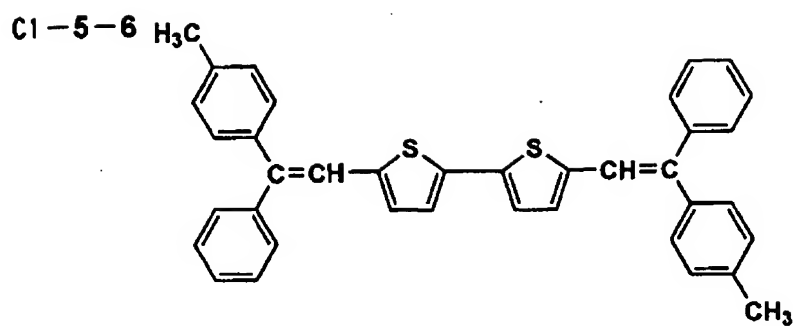
[0479]

[Chemical formula 338]



[0480]

[Chemical formula 339]

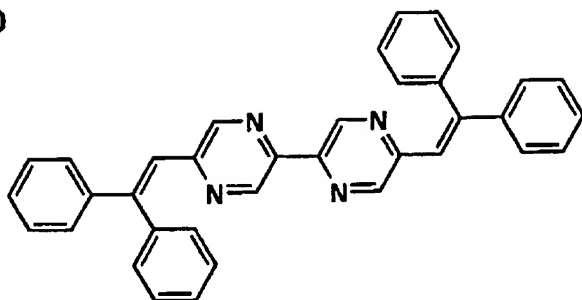




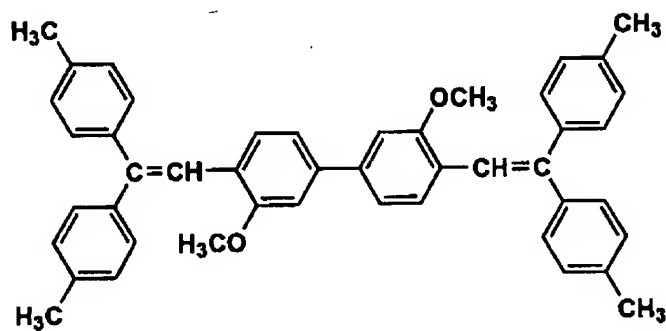
[0481]

[Chemical formula 340]

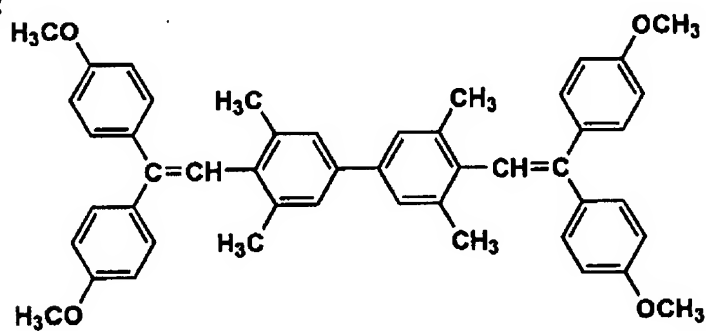
C1-5-10



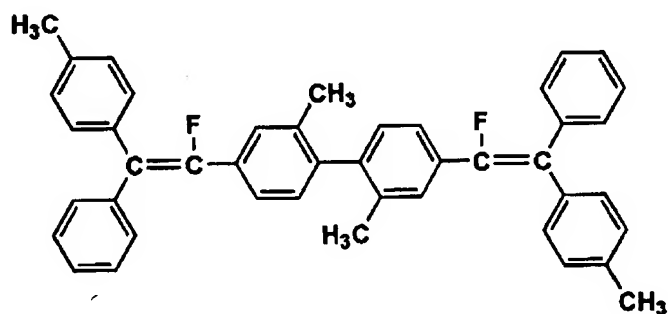
C1-5-11



C1-5-12



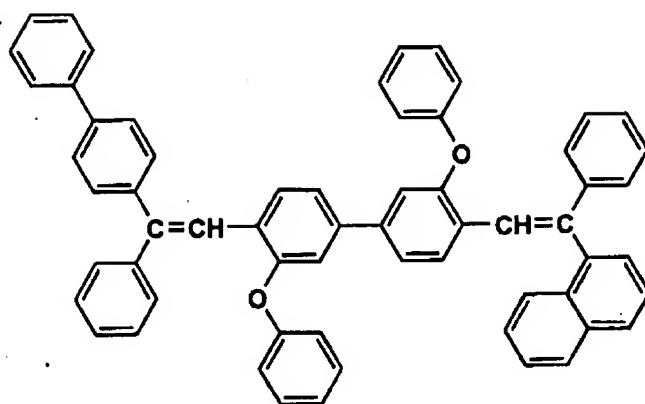
C1-5-13



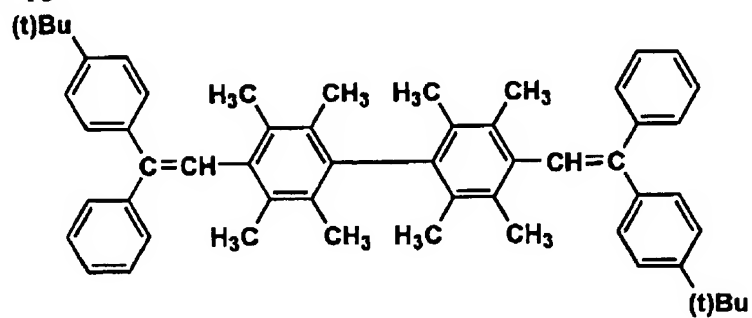
[0482]

[Chemical formula 341]

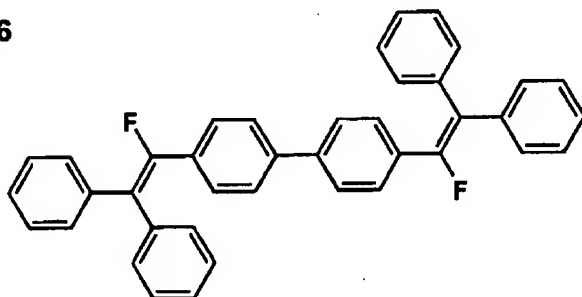
C1-5-14



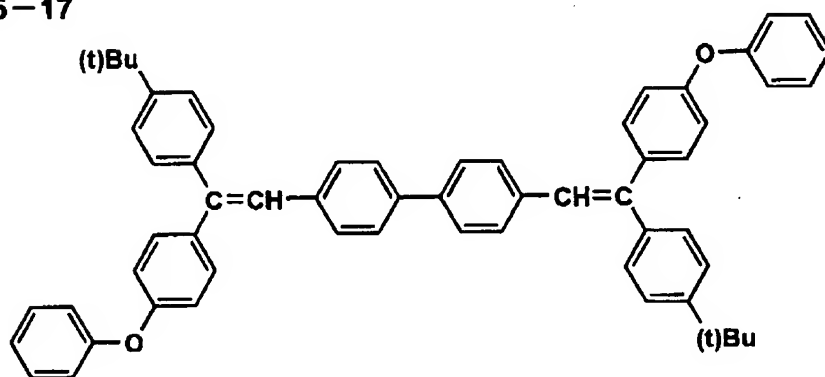
C1-5-15



C1-5-16

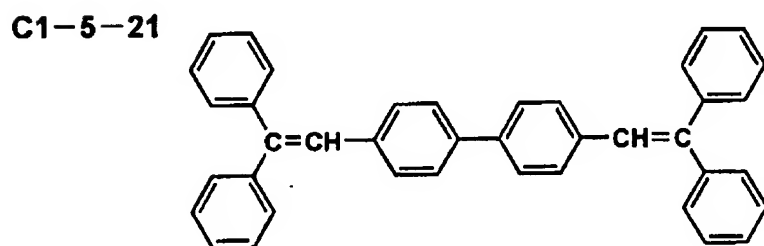
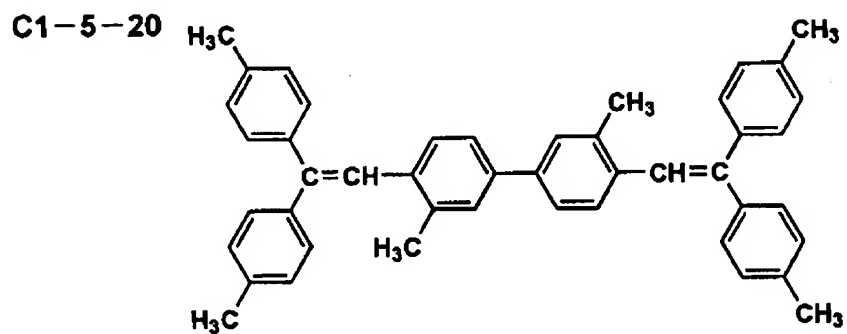
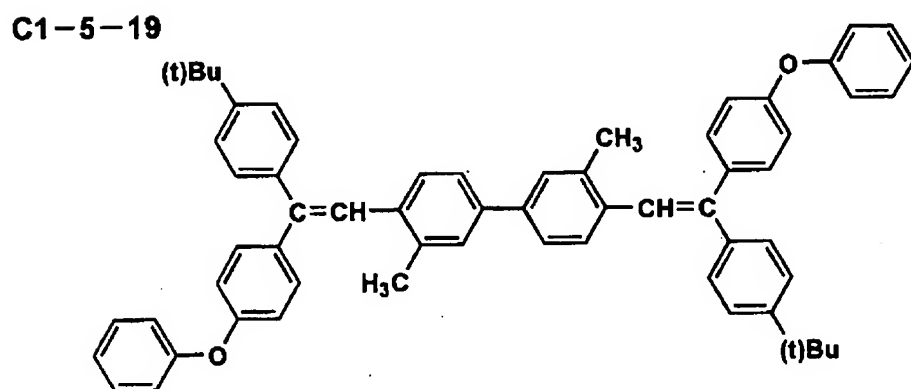
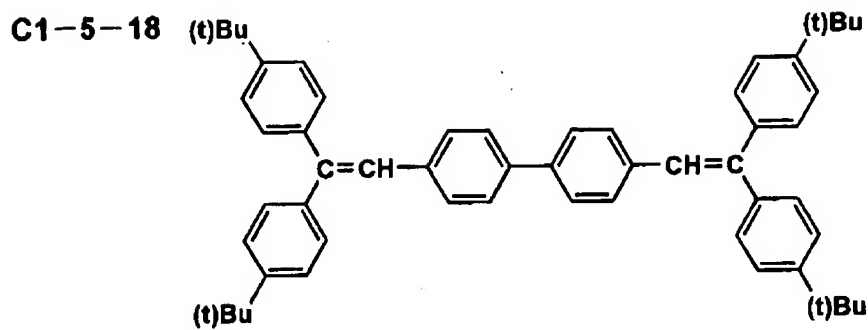


C1-5-17



[0483]

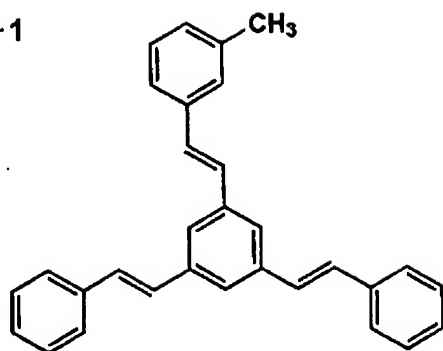
[Chemical formula 342]



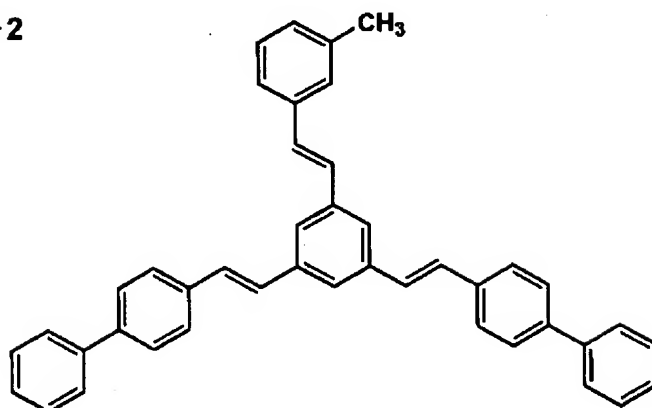
[0484]

[Chemical formula 343]

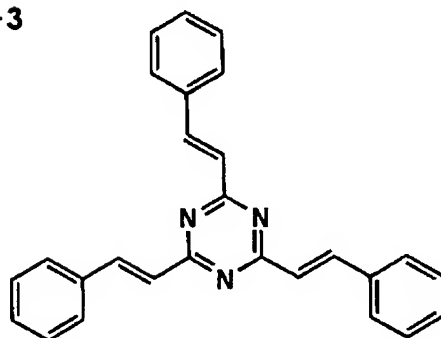
**C1-6-1**



**C1-6-2**



**C1-6-3**

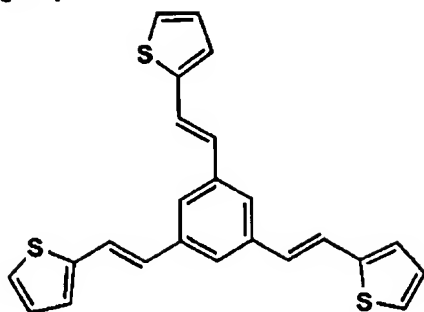


[0485]

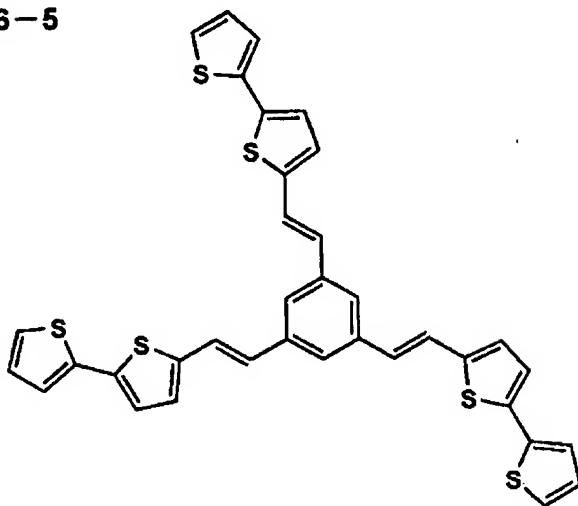
[Chemical formula 344]



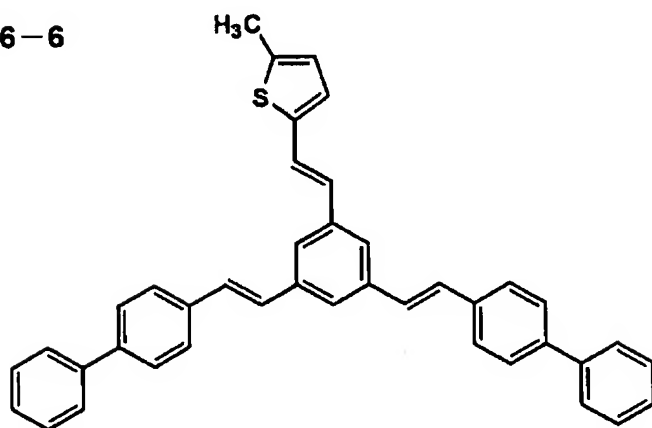
C1-6-4



C1-6-5



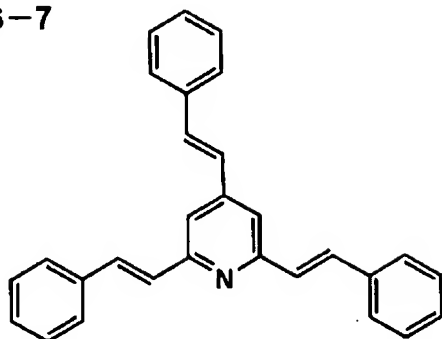
C1-6-6



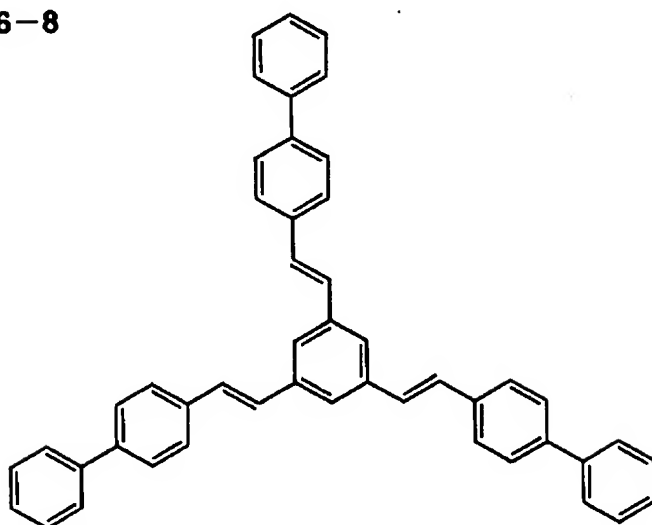
[0486]

[Chemical formula 345]

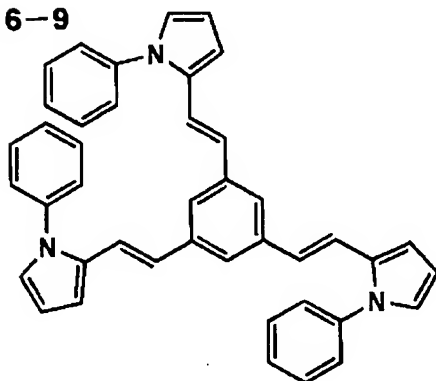
C1-6-7



C1-6-8

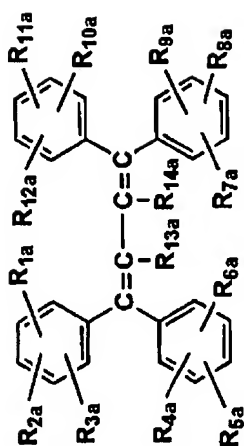


C1-6-9

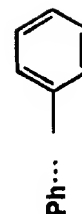


[0487]

[Chemical formula 346]



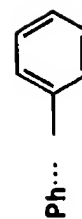
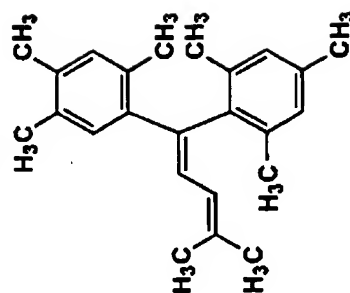
No.	R <sub>1a</sub>	R <sub>2a</sub>	R <sub>3a</sub>	R <sub>4a</sub>	R <sub>5a</sub>	R <sub>6a</sub>	R <sub>7a</sub>	R <sub>8a</sub>	R <sub>9a</sub>	R <sub>10a</sub>	R <sub>11a</sub>	R <sub>12a</sub>	R <sub>13a</sub>	R <sub>14a</sub>
C1-7-1	p-CH <sub>3</sub>	H	H	p-CH <sub>3</sub>	H	H	p-CH <sub>3</sub>	H	H	p-CH <sub>3</sub>	H	H	H	H
C1-7-2	m-CH <sub>3</sub>	H	H	m-CH <sub>3</sub>	H	H	m-CH <sub>3</sub>	H	H	m-CH <sub>3</sub>	H	H	H	H
C1-7-3	o-CH <sub>3</sub>	H	H	o-CH <sub>3</sub>	H	H	o-CH <sub>3</sub>	H	H	o-CH <sub>3</sub>	H	H	H	H
C1-7-4	p-Ph	H	H	p-Ph	H	H	p-Ph	H	H	p-Ph	H	H	H	H
C1-7-5	p-C <sub>2</sub> H <sub>5</sub>	H	H	p-C <sub>2</sub> H <sub>5</sub>	H	H	p-C <sub>2</sub> H <sub>5</sub>	H	H	p-C <sub>2</sub> H <sub>5</sub>	H	H	H	H
C1-7-6	p-t-C <sub>4</sub> H <sub>9</sub>	H	H	p-t-C <sub>4</sub> H <sub>9</sub>	H	H	p-t-C <sub>4</sub> H <sub>9</sub>	H	H	p-t-C <sub>4</sub> H <sub>9</sub>	H	H	H	H
C1-7-7	p-n-C <sub>12</sub> H <sub>25</sub>	H	H	p-n-C <sub>12</sub> H <sub>25</sub>	H	H	p-n-C <sub>12</sub> H <sub>25</sub>	H	H	p-n-C <sub>12</sub> H <sub>25</sub>	H	H	H	H
C1-7-8	p-CH <sub>3</sub>	o-CH <sub>3</sub>	H	p-CH <sub>3</sub>	o-CH <sub>3</sub>	H	p-CH <sub>3</sub>	o-CH <sub>3</sub>	H	p-CH <sub>3</sub>	o-CH <sub>3</sub>	H	H	H
C1-7-9	p-OCH <sub>3</sub>	H	H	p-OCH <sub>3</sub>	H	H	p-OCH <sub>3</sub>	H	H	p-OCH <sub>3</sub>	H	H	H	H
C1-7-10	p-N(CH <sub>3</sub> ) <sub>2</sub>	H	H	p-N(CH <sub>3</sub> ) <sub>2</sub>	H	H	p-N(CH <sub>3</sub> ) <sub>2</sub>	H	H	p-N(CH <sub>3</sub> ) <sub>2</sub>	H	H	H	H
C1-7-11	p-N(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub>	H	H	p-N(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub>	H	H	p-N(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub>	H	H	p-N(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub>	H	H	H	H
C1-7-12	p-N(CH <sub>3</sub> ) <sub>2</sub>	H	H	p-N(CH <sub>3</sub> ) <sub>2</sub>	H	H	H	H	H	H	H	H	H	H
C1-7-13	p-CH <sub>3</sub>	H	H	p-CH <sub>3</sub>	H	H	H	H	H	H	H	H	H	H
C1-7-14	p-OC <sub>2</sub> H <sub>5</sub>	H	H	p-OC <sub>2</sub> H <sub>5</sub>	H	H	p-OC <sub>2</sub> H <sub>5</sub>	H	H	p-OC <sub>2</sub> H <sub>5</sub>	H	H	H	H



[0488]

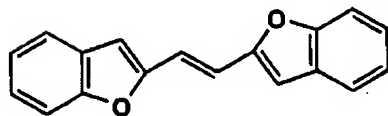
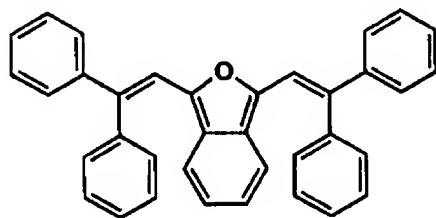
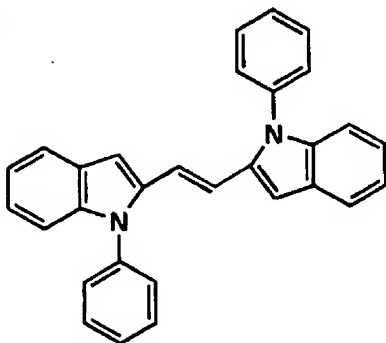
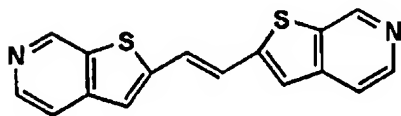
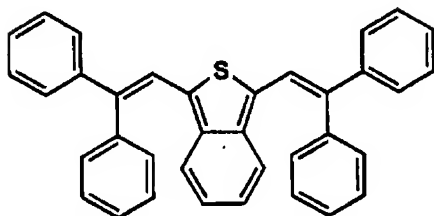
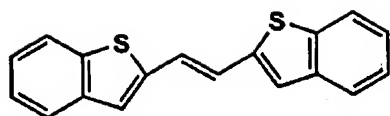
[Chemical formula 347]

No.	R <sub>1a</sub>	R <sub>2a</sub>	R <sub>3a</sub>	R <sub>4a</sub>	R <sub>6a</sub>	R <sub>8a</sub>	R <sub>9a</sub>	R <sub>10a</sub>	R <sub>11a</sub>	R <sub>12a</sub>	R <sub>13a</sub>	R <sub>14a</sub>
C1-7-15	o-CH <sub>3</sub>	H	H	o-CH <sub>3</sub>	H	H	H	H	H	H	H	H
C1-7-16	p-Ph	H	H	p-Ph	H	H	H	H	H	H	H	H
C1-7-17	H	H	H	H	H	H	H	H	H	H	CH <sub>3</sub>	CH <sub>3</sub>
C1-7-18	H	H	H	H	H	H	H	H	H	H	OCH <sub>3</sub>	OCH <sub>3</sub>
C1-7-19	H	H	H	H	H	H	H	H	H	H	Ph	Ph
C1-7-20	H	H	H	H	H	H	H	H	H	H	Cl	Cl
C1-7-21	CH <sub>3</sub>	CH <sub>3</sub>	CH <sub>3</sub>	CH <sub>3</sub>	CH <sub>3</sub>	CH <sub>3</sub>	CH <sub>3</sub>	CH <sub>3</sub>	CH <sub>3</sub>	CH <sub>3</sub>	H	H
C1-7-22	p-CH <sub>3</sub>	H	H	H	H	H	H	H	H	H	H	H
C1-7-23	p-N(CH <sub>3</sub> ) <sub>2</sub>	H	H	p-OCH <sub>3</sub>	H	H	H	p-OCH <sub>3</sub>	H	H	H	H
C1-7-24	p-CH <sub>3</sub>	H	H	p-OCH <sub>3</sub>	H	H	H	p-OCH <sub>3</sub>	H	H	H	H
C1-7-25	p-N(CH <sub>3</sub> ) <sub>2</sub>	H	H	p-OCH <sub>3</sub>	H	H	H	H	H	H	H	H
C1-7-26												



[0489]

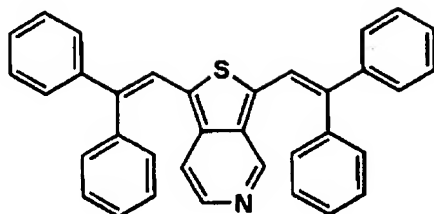
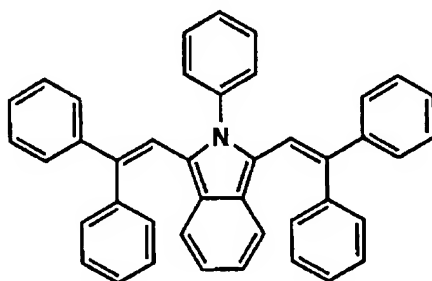
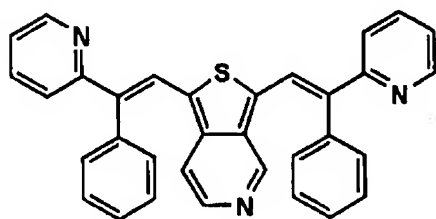
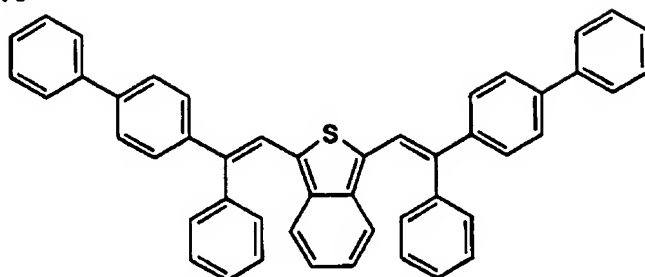
[Chemical formula 348]





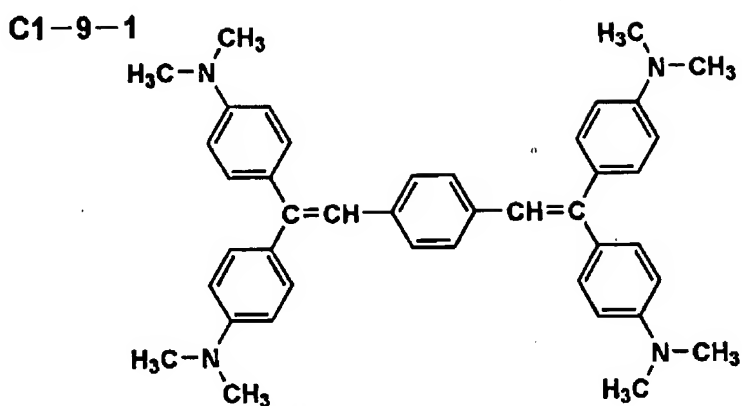
[0490]

[Chemical formula 349]

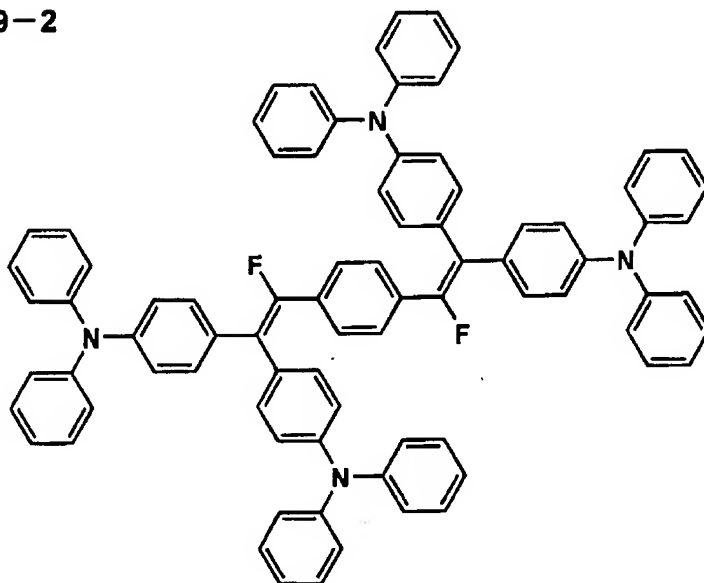
**C1-8-7****C1-8-8****C1-8-9****C1-8-10**

[0491]

[Chemical formula 350]



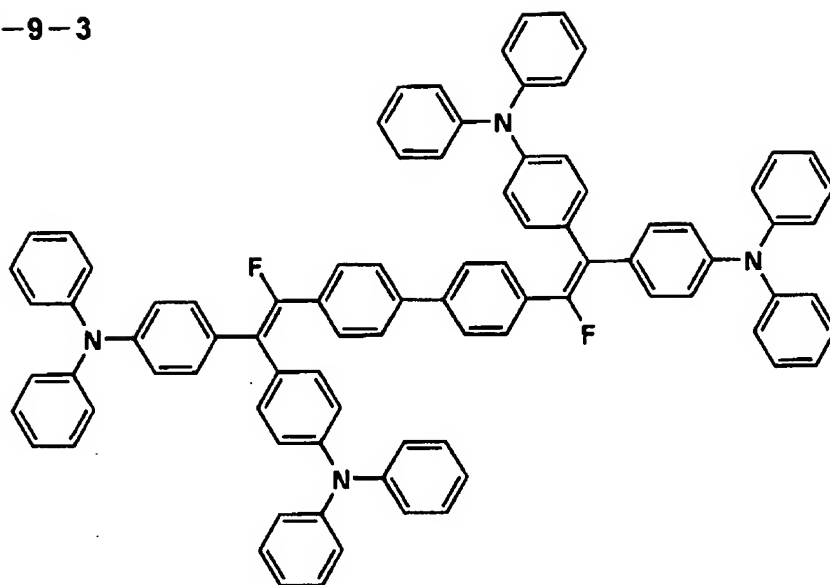
**C1-9-2**



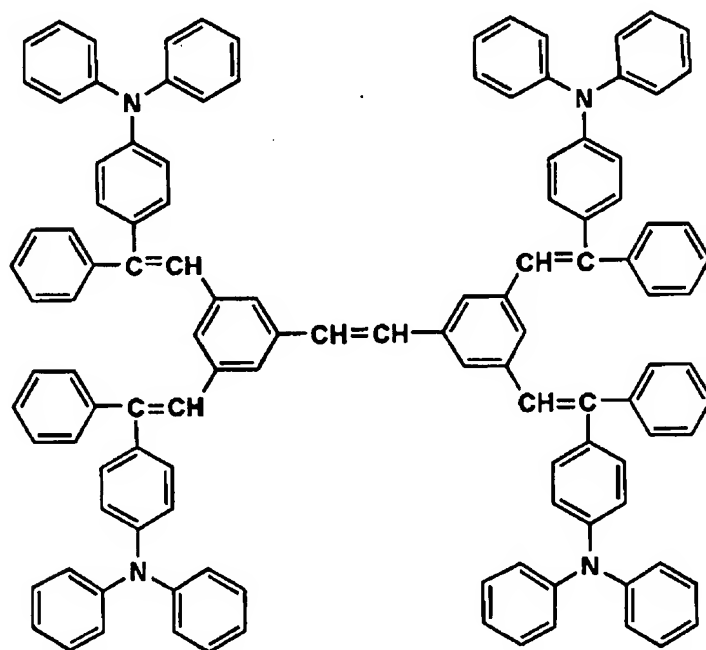
[0492]

[Chemical formula 351]

C1-9-3



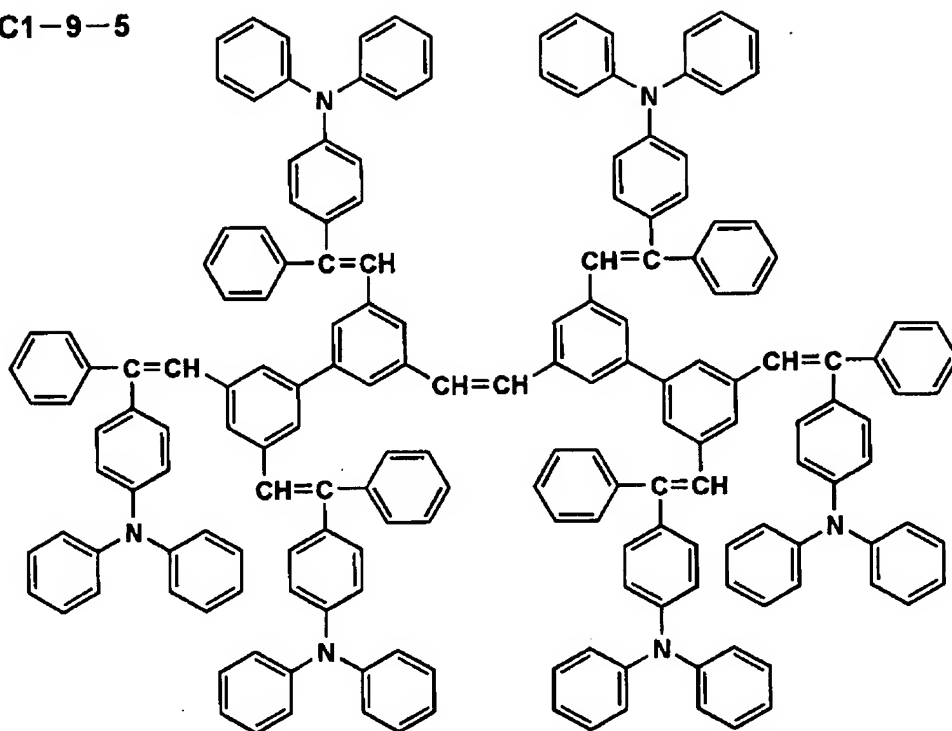
C1-9-4



[0493]

[Chemical formula 352]

**C1-9-5**



[0494] These compounds are compounds which have strong fluorescence in a solid state. It excels also in electric field luminescence and can be effectively used as a luminescent material.

[0495] These compounds are compoundable by the method of the conventional known. For example, it is detailed to the registration patent No. 3086272, the registration patent No. 3214674, etc.

[0496] The compound denoted by a general formula (C2-1) is explained.

[0497] In a general formula (C2-1),  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$ ,  $X_1$ , and  $Y_1$  express the substituent of a hydrogen atom or 1 value, and  $Z_1$  expresses  $CR_{15}R_{16}$ , O, S, and  $SiR_{17}R_{18}$ .  $R_{15}$ ,  $R_{16}$ ,  $R_{17}$ , and  $R_{18}$  express the substituent of a hydrogen atom or 1 value.

[0498] [ as a substituent of the 1 value of  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$ ,  $X_1$ ,  $Y_1$ ,  $R_{15}$ ,  $R_{16}$ ,  $R_{17}$ , and  $R_{18}$  ]  
 an alkyl group (a methyl group, an ethyl group, i-propyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, aryl groups (a phenyl group and a naphthyl group.), such as a cyclohexyl group and a benzyl group alkyloxy machines (a methoxy group.), such as p-trill machine and p-chlorophenyl machine Aryloxy groups, such as an ethoxy basis, i-propoxy group, and a butoxy machine (phenoxy group etc.), An alkylthio group (a methylthio group, an ethyl thio group, i-propyl thio group, etc.), arylthio groups (phenylthio group etc.) and a halogen atom (a fluorine atom.) A cyano group, a nitro group and heterocyclic machines (a pyrrole group, a pyrrolidyl machine, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, a benzoxazolyl machine, etc.), such as a chlorine atom, a bromine atom, and an iodine atom, an aromatic series machine, etc. are mentioned. As an aromatic series machine, the above-mentioned aryl group and heteroaryl groups (a pyrrole group, a pyrazolyl machine, an imidazolyl group, a pyridyl group, etc.) are mentioned. Adjoining substituents may form a ring. It is a time of  $Z_1$  being O or  $SiR_{17}R_{18}$  preferably, and they are an alkyl group or an aromatic series machine as a desirable example of the substituent of 1 value.

[0499] The compound of this invention is a compound which has strong fluorescence in a solid state.

It excels also in electric field luminescence and can be effectively used as a luminescent material.

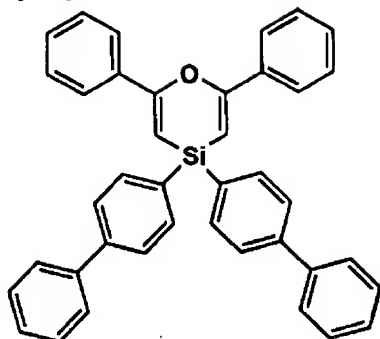
Since it excels in electronic pouring nature and electron transport property outstanding from the metal electrode very much, when it is used for the organic EL device using other luminescent materials as an electronic transportation material, the outstanding luminous efficiency is shown.

[0500]Although the example of a concrete compound is given to below, this invention is not limited to these.

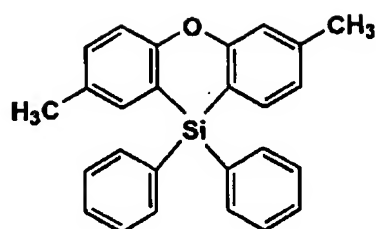
[0501]

[Chemical formula 353]

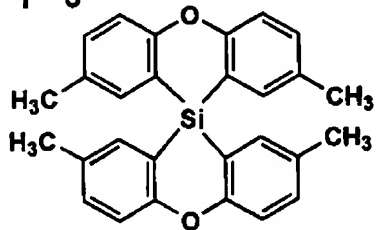
C2-1-1



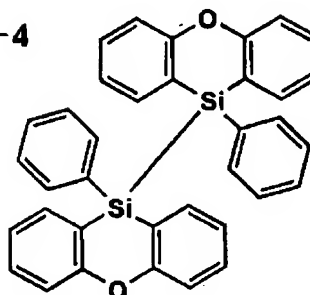
C2-1-2



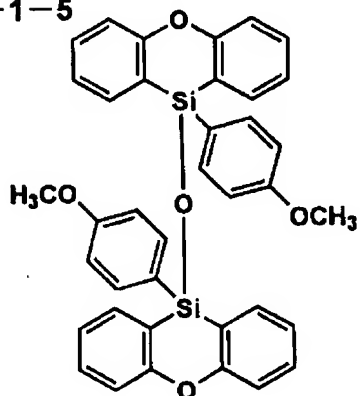
C2-1-3



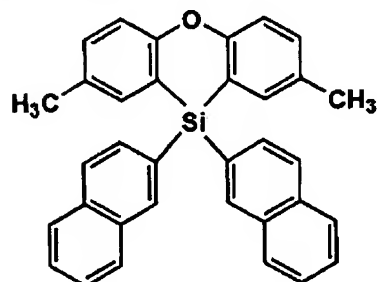
C2-1-4



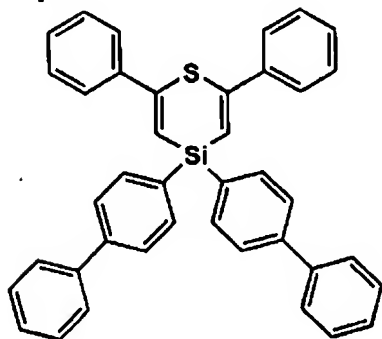
C2-1-5



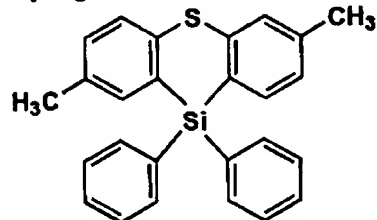
C2-1-6



C2-1-7



C2-1-8

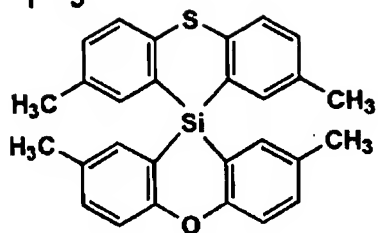




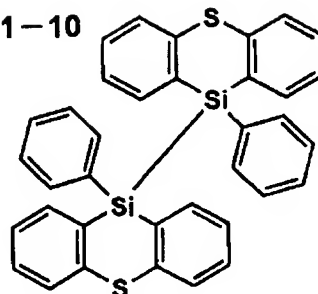
[0502]

[Chemical formula 354]

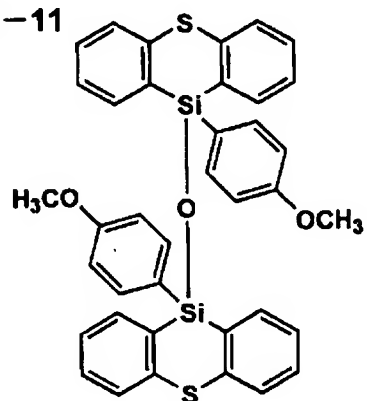
C2-1-9



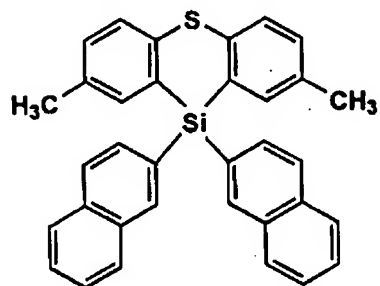
C2-1-10



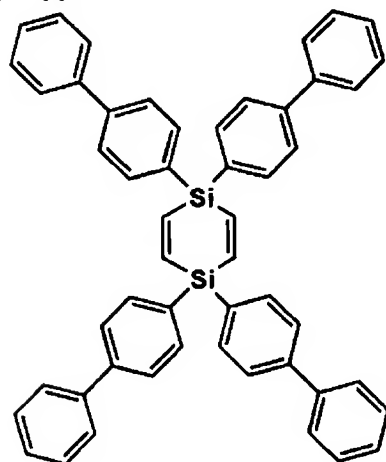
C2-1-11



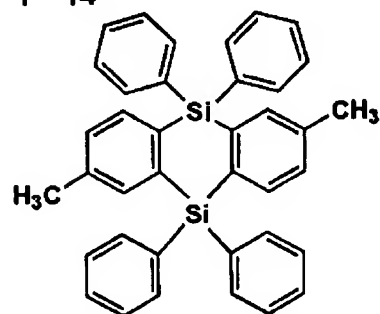
C2-1-12



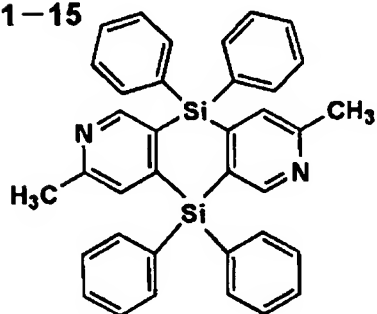
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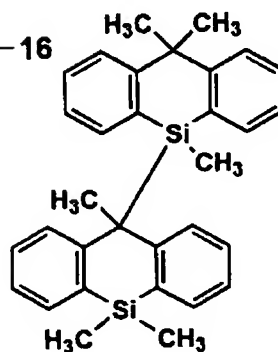
C2-1-14



C2-1-15



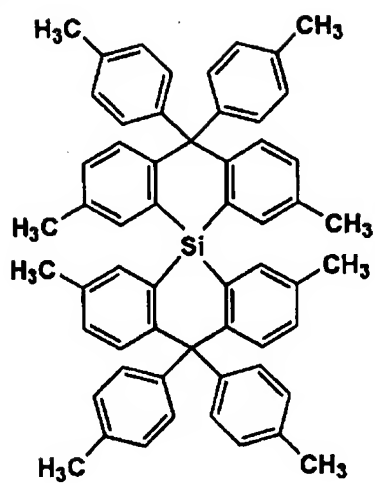
C2-1-16



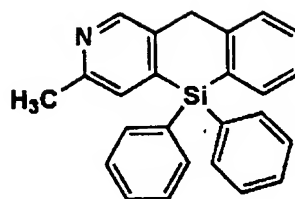
[0503]

[Chemical formula 355]

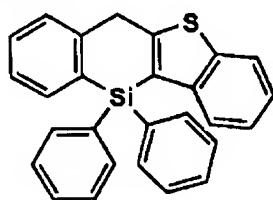
C2-1-17



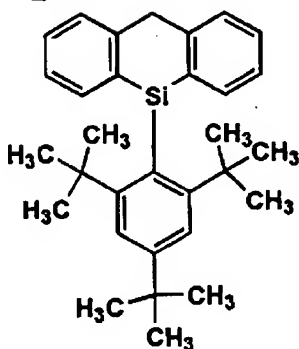
C2-1-18



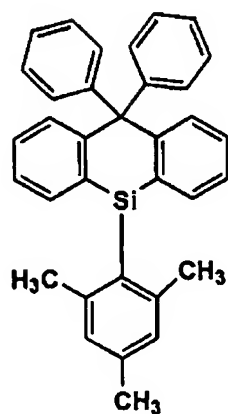
C2-1-19



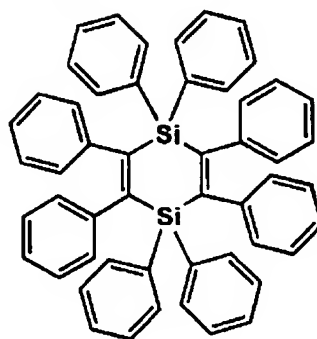
C2-1-20



C2-1-21



C2-1-22



[0504]In a molecule, the host compound of this invention is a \*\*\*\* matter atom a compound to contain, and, [ as a desirable compound ] The polysilane which has a repetition structure unit denoted by said general formula (C2-2) or a general formula (C2-3), and the compound denoted by said general formula (C2-4) - (C2-7) are raised.

[0505]In said general formula (C2-2),  $R_{21}$  and  $R_{22}$  are an alkyl group, an aromatic series machine, an alkoxy group, or an aryloxy group. [ as an example of an alkyl group denoted by  $R_{21}$  and  $R_{22}$  ] A methyl group, an ethyl group, i-propyl group, a hydroxyethyl machine, a methoxymethyl machine, They are mentioned by a trifluoromethyl group, t-butyl group, a cyclopentyl group, a cyclohexyl group, benzyl group, etc., and, [ as an example of an aromatic series machine ] A phenyl group, a naphthyl group, p-trill machine, p-chlorophenyl machine, a pyrrole group, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, benzoxazolyl, etc. are mentioned. As an example of an alkoxy group, a methoxy group, an ethoxy basis, i-propoxy group, a butoxy machine, etc. are mentioned, and a phenoxy group etc. are mentioned as an aryloxy group. n expresses an integer greater than or equal to 3.

[0506]In said general formula (C2-3),  $R_{31}$  is synonymous with  $R_{21}$  in a general formula (C2-2), and  $Ar_{31}$  expresses the Ally Wren machine. As an example of the Ally Wren machine denoted by  $Ar_{31}$ , 1,4-phenylene, 1, and 5-naphthylene machine is mentioned, for example, and  $R_{32}$  and  $R_{33}$  express an alkyl group and an aromatic series machine independently, respectively. The alkyl group denoted by  $R_{32}$  and  $R_{33}$  and the aromatic series machine are synonymous with the alkyl group denoted by said  $R_{21}$ , and an aromatic series machine.



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For subsequent translation(s), please click on the above "CONTINUE" button.

When continued, the current translation will be overwritten with the new translation.

[Translation done.]

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[0507]Next, the compound denoted by said general formula (C2-4) is explained. In a general formula (C2-4),  $R_{41}$ ,  $R_{42}$ ,  $R_{43}$ , and  $R_{44}$  are the substituents of 1 value, and at least one piece expresses an aromatic series machine. as the substituent of 1 value -- an alkyl group (a methyl group, an ethyl group, and i-propyl group.) A hydroxyethyl machine, a methoxymethyl machine, a trifluoromethyl group, t-butyl group, aryl groups (a phenyl group.), such as a cyclopentyl group, a cyclohexyl group, and a benzyl group alkyloxy machines (a methoxy group.), such as a naphthyl group, p-trill machine, and p-chlorophenyl machine Aryloxy groups, such as an ethoxy basis, i-propoxy group, and a butoxy machine (phenoxy group etc.), An alkylthio group (a methylthio group, an ethyl thio group, i-propyl thio group, etc.), arylthio groups (phenylthio group etc.) and a halogen atom (a fluorine atom.) A cyano group, a nitro group, heterocyclic machines, etc. (a pyrrole group, a pyrrolidyl machine, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, a benzoxazolyl machine, etc.), such as a chlorine atom, a bromine atom, and an iodine atom, are mentioned. As an aromatic series machine, the above-mentioned aryl group and heteroaryl groups (a pyrrole group, a pyrazolyl machine, an imidazolyl group, a pyridyl group, etc.) are mentioned. Preferably, it is a time of all of  $R_{41}$ ,  $R_{42}$ ,  $R_{43}$ , and  $R_{44}$  being aromatic series machines. In a general formula (C2-4), it is a time of all being aromatic series machines preferably, and is a time of at least one of  $R_{41}$ ,  $R_{42}$ ,  $R_{43}$ , and the  $R_{44}$  being a condensation aromatic series machine more preferably.

[0508]Next, a general formula (C2-5) is explained.  $R_{51}$ ,  $R_{52}$ ,  $X_5$ , and  $Y_5$  express the substituent of a hydrogen atom or 1 value independently, respectively.  $Z_{51}$  and  $Z_{52}$  express a nitrogen atom or  $CR_{53}$  independently, respectively, and  $R_{53}$  expresses the substituent of a hydrogen atom or 1 value. The substituent denoted by  $R_{41}$  as an example of the substituent of 1 value and the same substituent are mentioned. Adjoining substituents may form a ring.

[0509]In a general formula (C2-6),  $R_{61}$ ,  $R_{62}$ ,  $R_{63}$ , The substituent which  $R_{64}$ ,  $R_{65}$ ,  $R_{66}$ ,  $R_{67}$ ,  $R_{68}$ ,  $X_6$ , and  $Y_6$  express the substituent of a hydrogen atom or 1 value, and is denoted by  $R_{61}$  as an example of the substituent of 1 value, and the same substituent are mentioned.

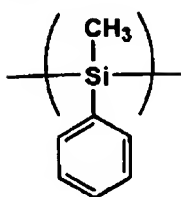
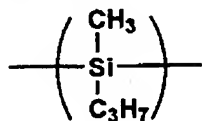
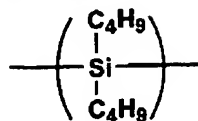
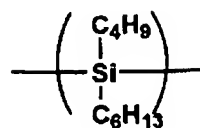
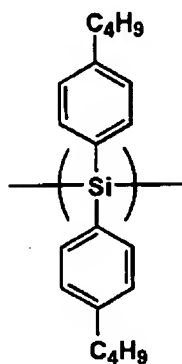
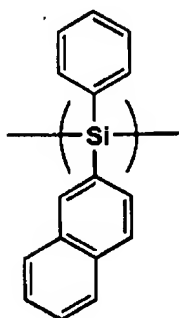
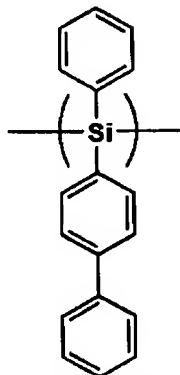
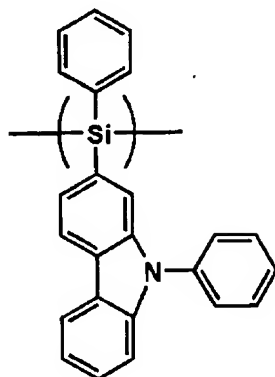
[0510]Next, a general formula (C2-7) is explained.  $R_{71}$ ,  $R_{72}$ ,  $R_{73}$ ,  $R_{74}$ ,  $X_7$ , and  $Y_7$  express the substituent of a hydrogen atom or 1 value. The substituent denoted by  $R_{41}$  as an example of the substituent of 1 value and the same substituent are mentioned.  $Z_7$  expresses  $CR_{75}R_{76}$ ,  $NR_{77}$ , O, S, or  $SiR_{78}R_{79}$ .  $R_{75}$ ,  $R_{76}$ ,  $R_{77}$ ,  $R_{78}$ , and  $R_{79}$  express the substituent of a hydrogen atom or 1 value. The substituent denoted by  $R_{41}$  as an example of the substituent of 1 value and the same substituent are mentioned.  $Z_7$  is  $CR_{75}R_{76}$ , O, or  $SiR_{78}R_{79}$  preferably.

[0511]Although the example of a concrete compound is shown below, the compound of this invention is not limited to these.

[0512]

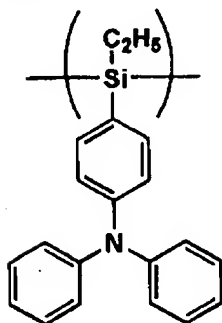
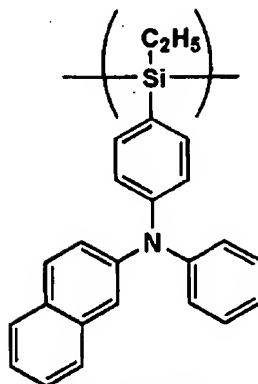
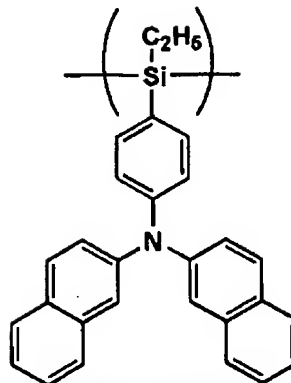
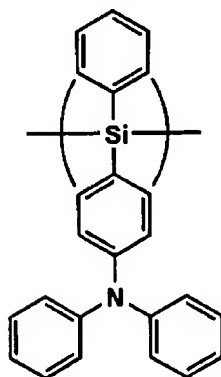
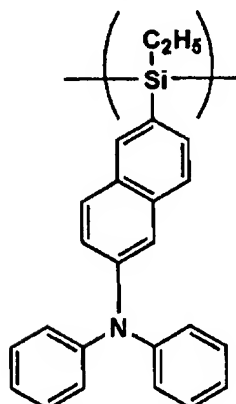
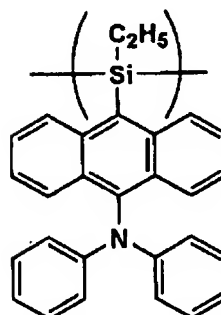
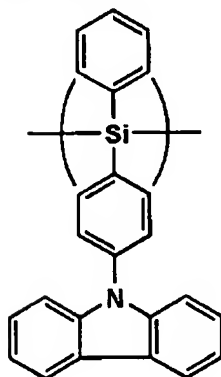
[Chemical formula 356]



**C2-2-1****M<sub>n</sub> = 15600****C2-2-2****M<sub>n</sub> = 23200****C2-2-3****M<sub>n</sub> = 21100****C2-2-4****M<sub>n</sub> = 26800****C2-2-5****M<sub>n</sub> = 21400****C2-2-6****M<sub>n</sub> = 19500****C2-2-7****M<sub>n</sub> = 18700****C2-2-8****M<sub>n</sub> = 19200**

[0513]

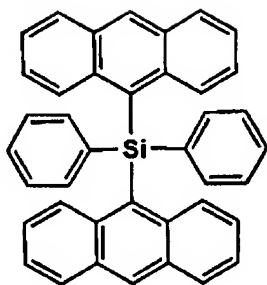
[Chemical formula 357]

**C2-3-1****M<sub>n</sub> = 24300****C2-3-2****M<sub>n</sub> = 23300****C2-3-3****M<sub>n</sub> = 23800****C2-3-4****M<sub>n</sub> = 22000****C2-3-5****M<sub>n</sub> = 19800****C2-3-6****M<sub>n</sub> = 18500****C2-3-7****M<sub>n</sub> = 21800**

[0514]

[Chemical formula 358]

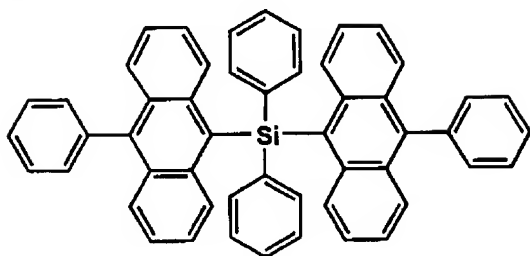
C2-4-1



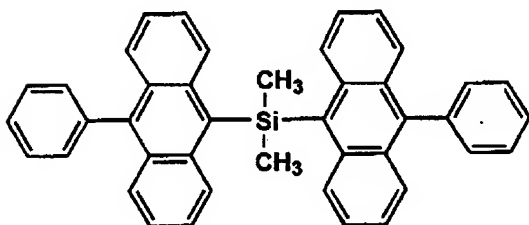
C2-4-2



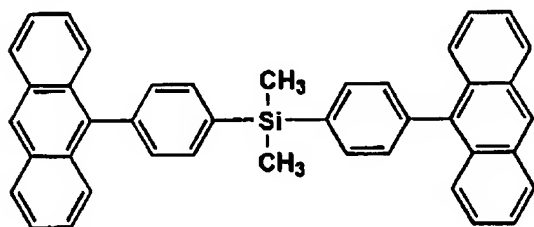
C2-4-3



C2-4-4

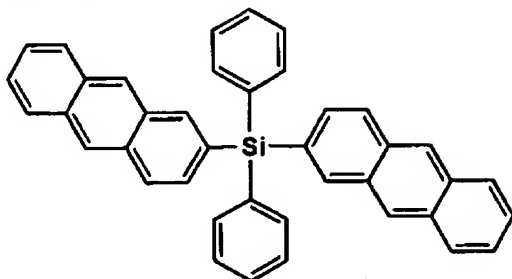
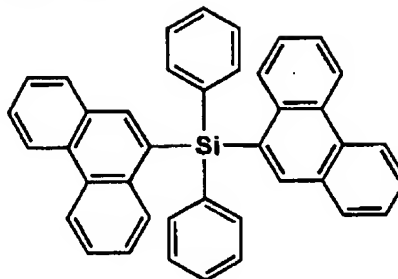
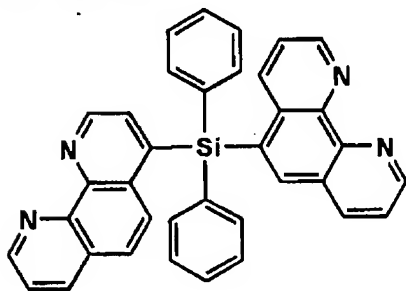
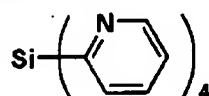
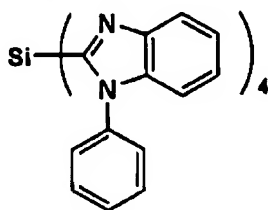
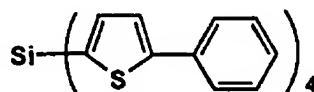
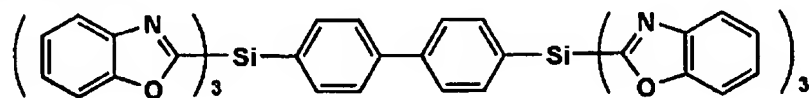
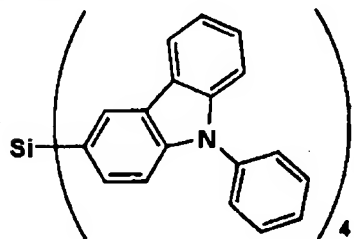
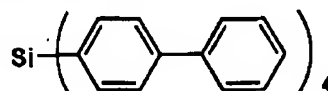


C2-4-5



[0515]

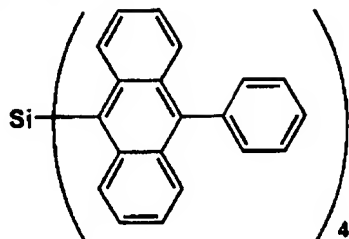
[Chemical formula 359]

**C2-4-6****C2-4-7****C2-4-8****C2-4-9****C2-4-10****C2-4-11****C2-4-12****C2-4-13****C2-4-14**

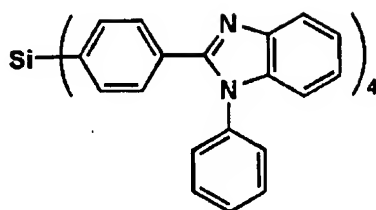
[0516]

[Chemical formula 360]

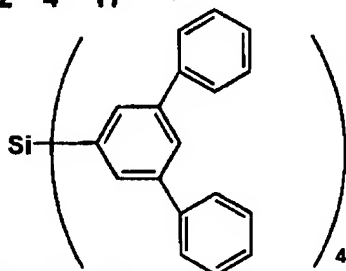
C2-4-15



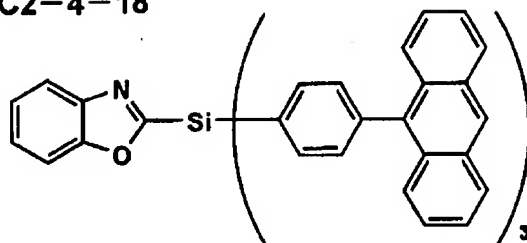
C2-4-16



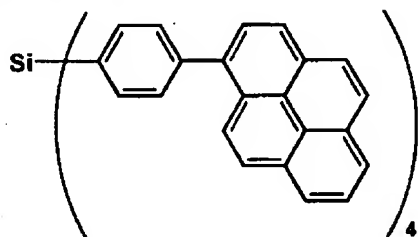
C2-4-17



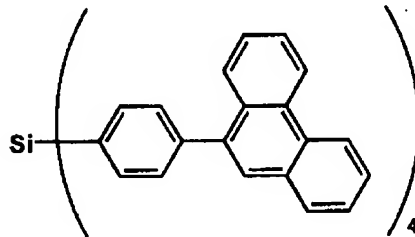
C2-4-18



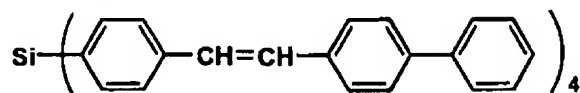
C2-4-19



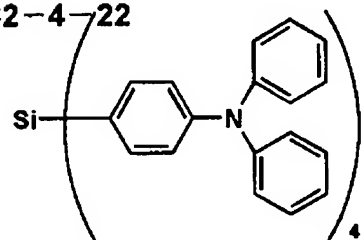
C2-4-20



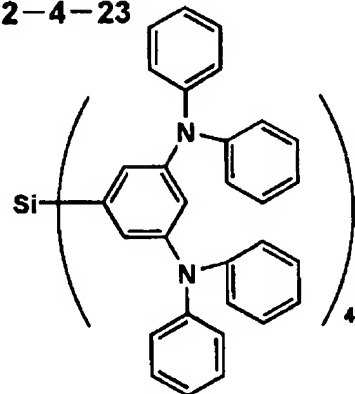
C2-4-21



C2-4-22

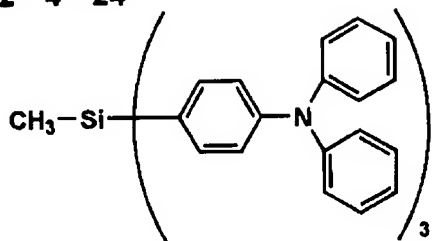
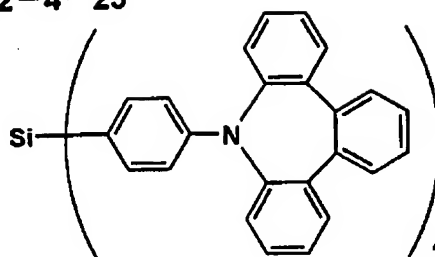
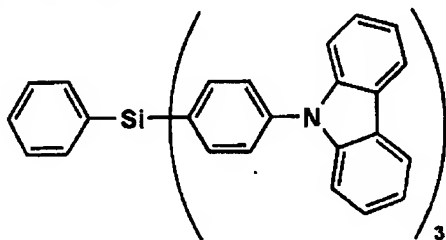
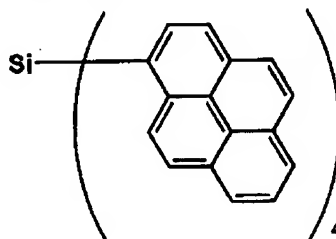
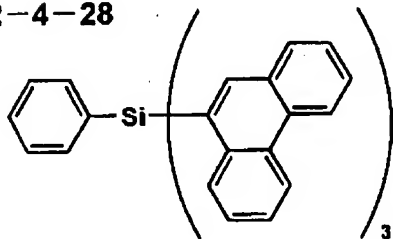


C2-4-23



[0517]

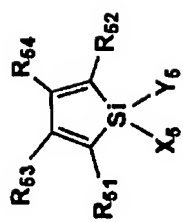
[Chemical formula 361]



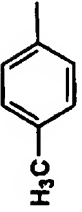
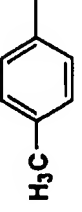
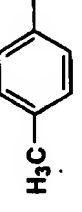
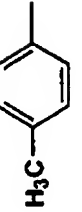


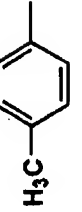
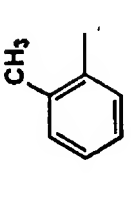
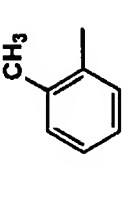
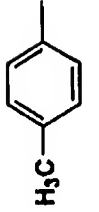


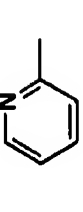
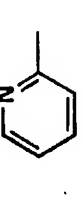
**C2-4-24****C2-4-25****C2-4-26****C2-4-27****C2-4-28**

[0518]



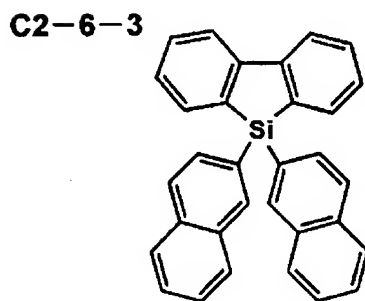
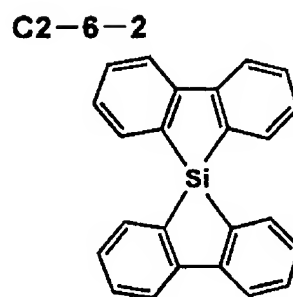
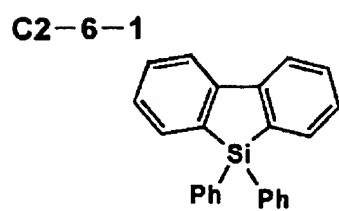
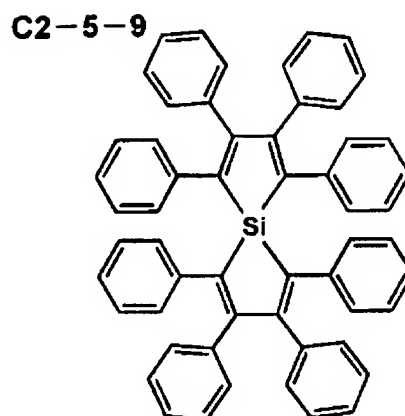
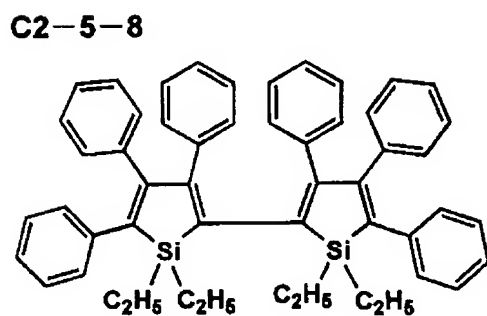
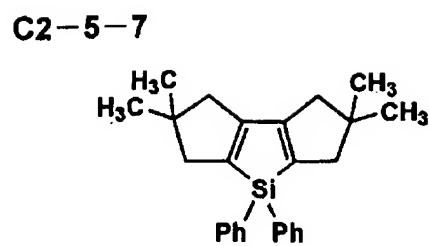
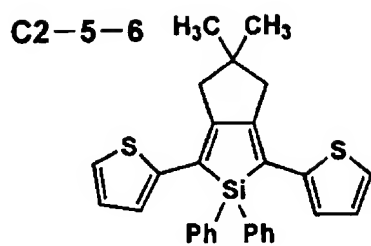
[Chemical formula 362]



化合物No.	R <sub>51</sub>	R <sub>53</sub>	R <sub>54</sub>	R <sub>52</sub>	X <sub>5</sub>	Y <sub>6</sub>
C2-5-1						
C2-5-2						
C2-5-3						
C2-5-4						
C2-5-5						

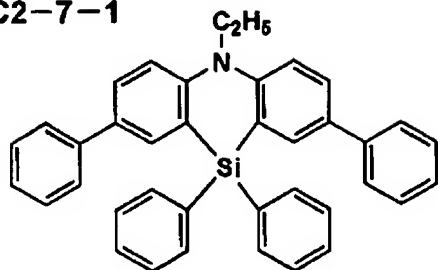
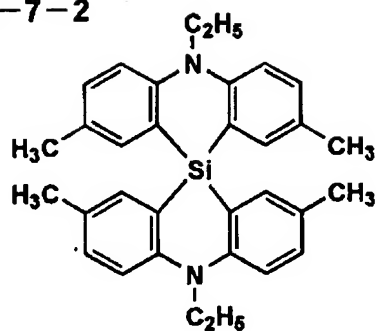
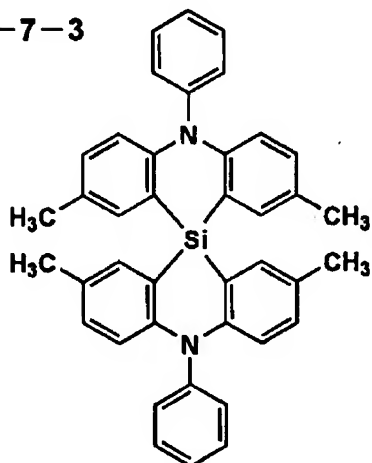
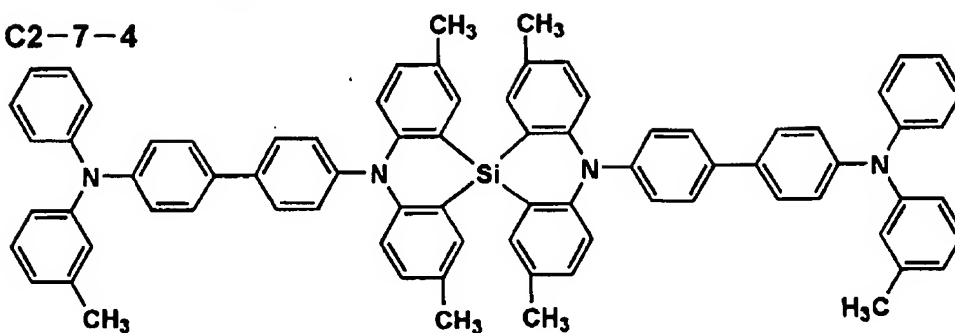
[0519]

[Chemical formula 363]



[0520]

[Chemical formula 364]

**C2-7-1****C2-7-2****C2-7-3****C2-7-4**

[0521]As an example of a compound denoted by a general formula (C2-7), said compound C2-1-1 - C2-1-22 is contained in addition to above-mentioned compound C2-7-the 1 - C2-7-4.

[0522]The compound denoted by the general formula (C3-1) thru/or general formula (C3-4) of this invention below is explained in detail.

[0523]In a general formula (C3-1) thru/or a general formula (C3-4), Ar<sub>11</sub> thru/or Ar<sub>16</sub>, Ar<sub>21</sub> thru/or Ar<sub>28</sub>, Ar<sub>31</sub> or Ar<sub>40</sub>, Ar<sub>41</sub>, or Ar<sub>52</sub> may express the aromatic hydrocarbon machine or aromatic heterocycle machine which may have a substituent respectively, and may differ, respectively, or may be the same. As an aromatic hydrocarbon machine, a phenyl, 1-Naff Chill, 2-Naff Chill, 4-biphenyl, 3-biphenyl, 9-phenan thrill machine, etc. are mentioned, and thiophenyl, quinolyl, iso quinolyl, benzoxazolyl, a benzoimidazolyl group, etc. are mentioned as an aromatic heterocycle machine.

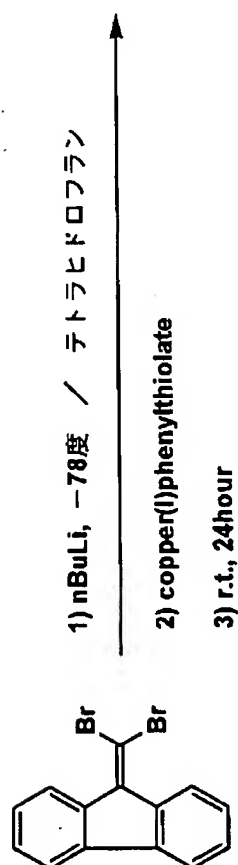
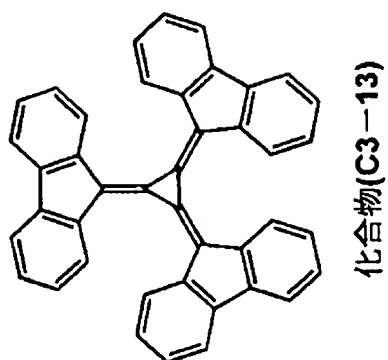
[0524]Although there is no restriction in particular as a substituent, alkyl groups (a methyl group, an ethyl group, a trifluoromethyl group, etc.), alkoxy groups (methoxy group etc.), halogen atoms (a fluorine atom, a chlorine atom, etc.), and aryl groups (phenyl group etc.) may be mentioned preferably, it may join together, respectively, and a ring may be formed.

[0525]Next, the typical synthetic example of a compound denoted by the general formula (C3-1) thru/or general formula (C3-4) of this invention is described.

[0526]Composition of a [synthetic example] compound (C3-13)

[0527]

[Chemical formula 365]



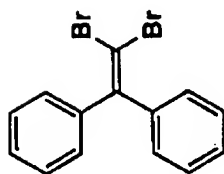
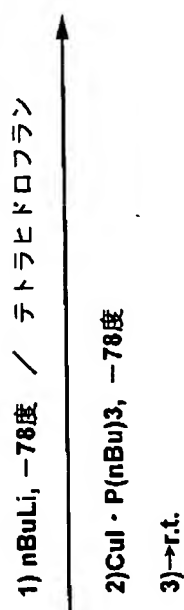
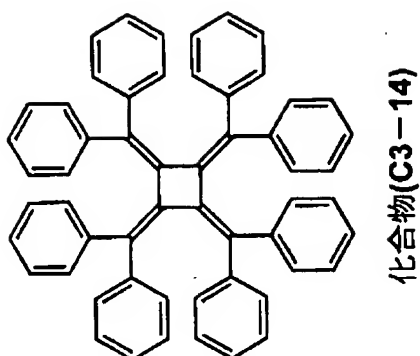
[0528]9-(dibromo methylene)- 2.90 g of full OREN is dissolved in 40 ml of drying-under nitrogen atmosphere tetrahydro frans, -6.33 ml of n-butyl lithium hexane (1.5 mol/L) solution is dropped at 90 \*\*, After having \*\*\*\*(ed) after adding 1.64g phenylthio rate copper (I), after 30-minute churning and, and agitating at room temperature for 24 hours, reaction solution was extracted, dried and condensed, refining was obtained by column chromatography and 1.00g (22% of \*\*\*\*) of compounds (C3-13) were obtained as re-crystallizing.

[0529]Composition of a [synthetic example] compound (C3-14)

[0530]

[Chemical formula 366]





[0531]The 1 and 1-dibromo 2 and 5.00 g of 2-diphenyl ethylene are dissolved in 100 ml of drying-under nitrogen atmosphere tetrahydro frans, -10.8 ml of n-butyl lithium hexane (1.5 mol/L) solution is dropped at  $90^\circ\text{C}$  \*\*, After having \*\*\*\*(ed) after adding 2.91g  $\text{CuI} \cdot \text{P}(\text{n-butyl})_3$ , after 30-minute churning and, and agitating at room temperature for 24 hours, reaction solution

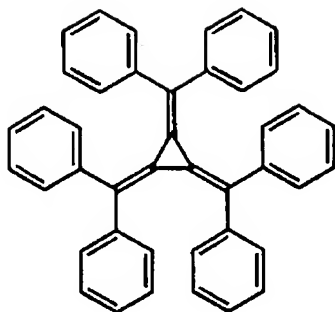
was extracted, dried and condensed, refining was obtained by column chromatography and 3.59g (34% of \*\*\*\*) of compounds (C3-14) were obtained as re-crystallizing.

[0532]Although the example of a compound denoted by the general formula (C3-1) thru/or a general formula (C3-4) below is shown, this invention is not limited to these.

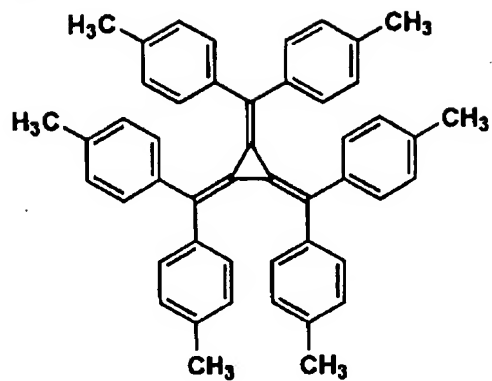
[0533]

[Chemical formula 367]

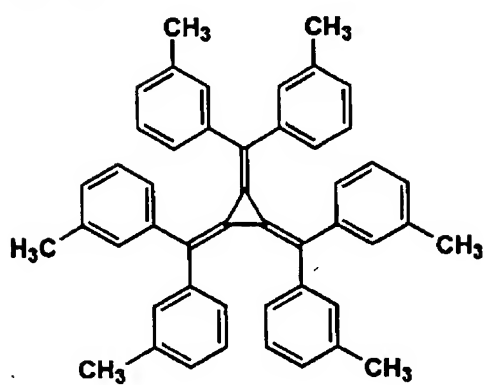
C3-1



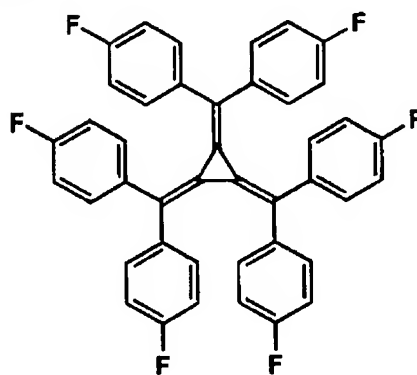
C3-2



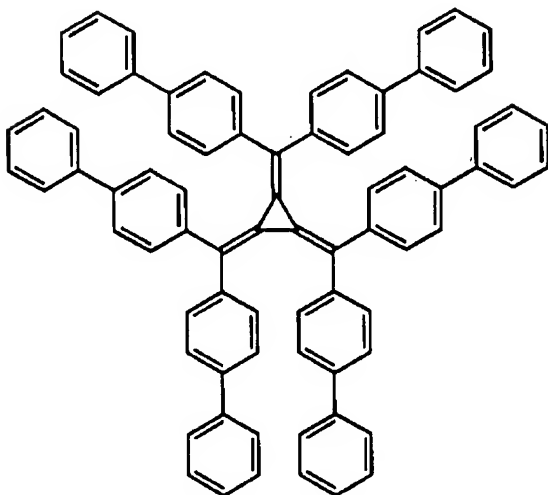
C3-3



C3-4



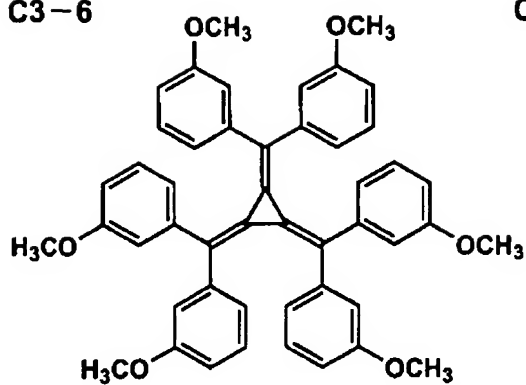
C3-5



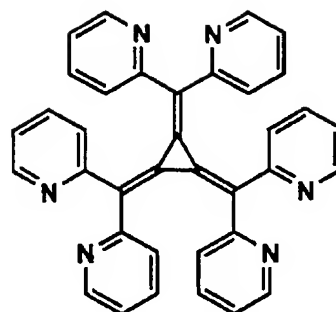
[0534]

[Chemical formula 368]

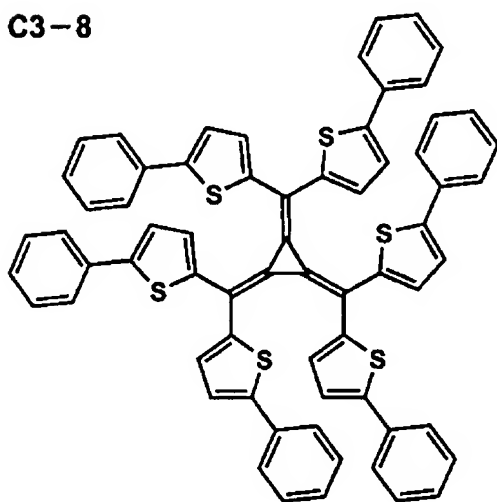
C3-6



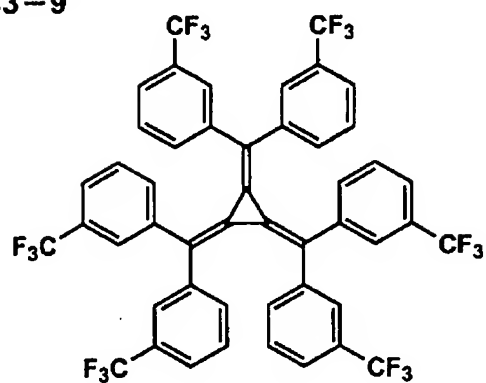
C3-7



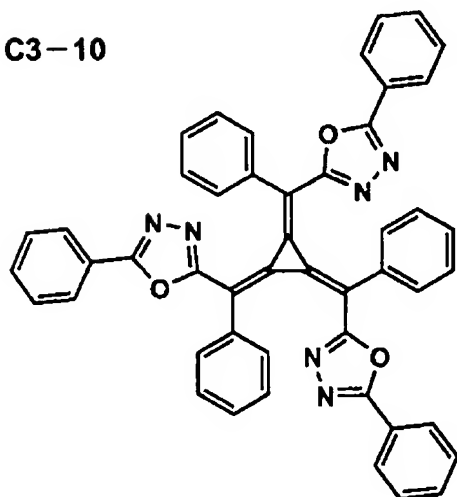
C3-8



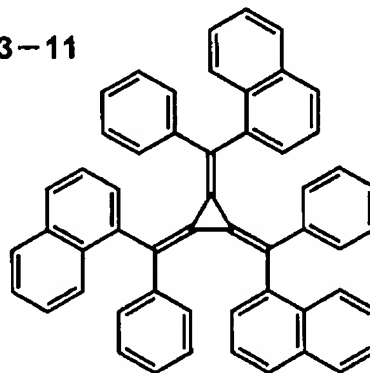
C3-9



C3-10



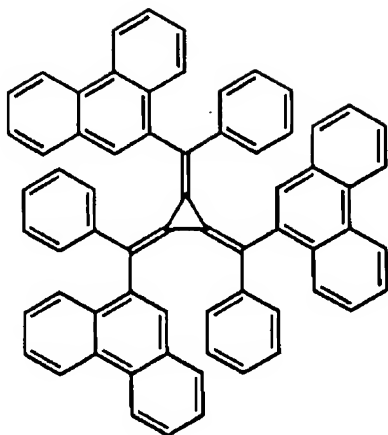
C3-11



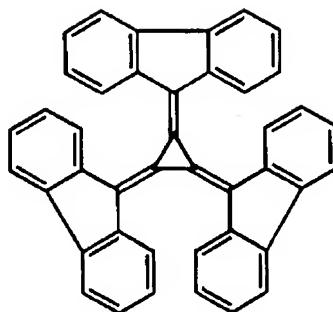
[0535]

[Chemical formula 369]

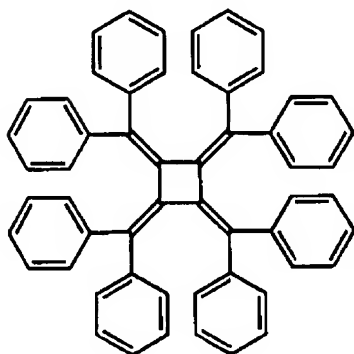
C3-12



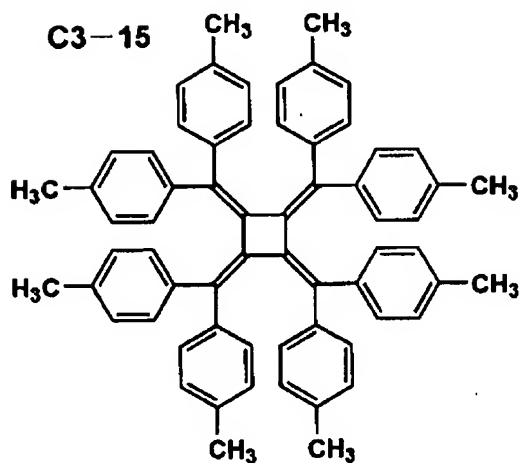
C3-13



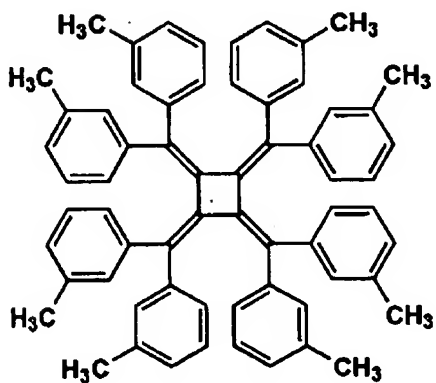
C3-14



C3-15



C3-16

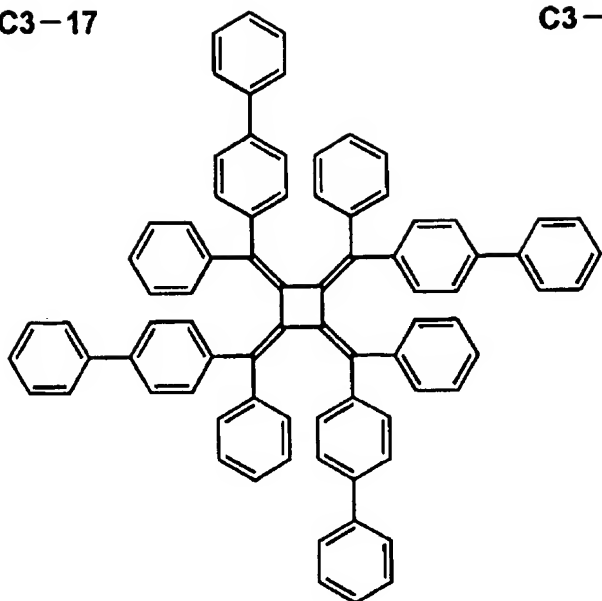


[0536]

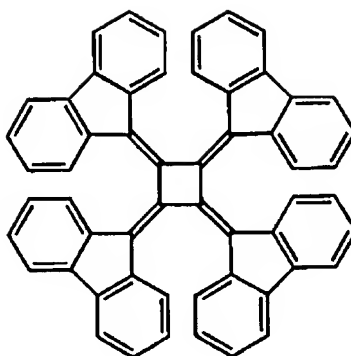
[Chemical formula 370]



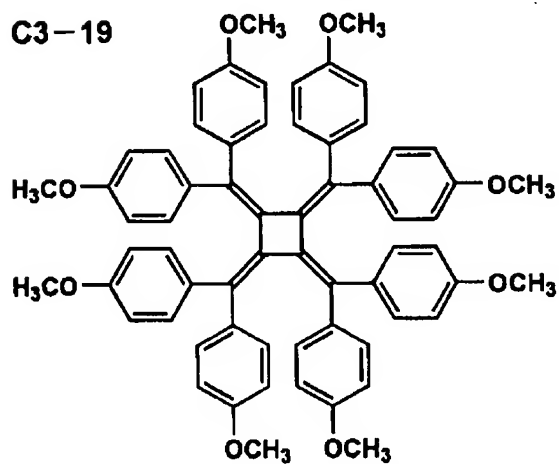
C3-17



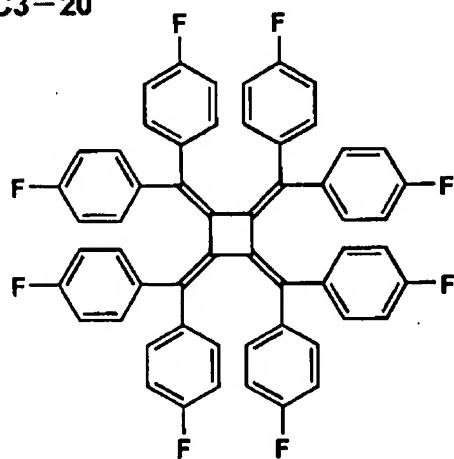
C3-18



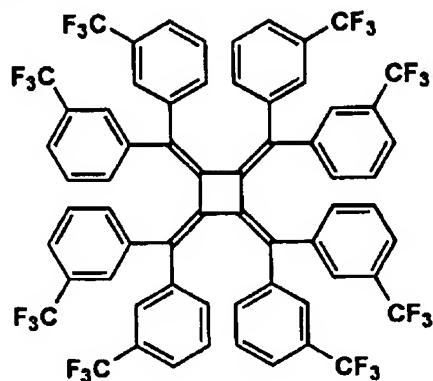
C3-19



C3-20



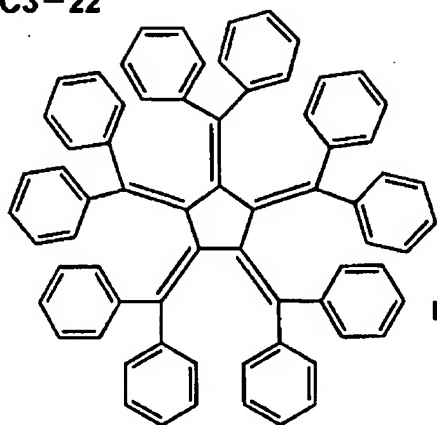
C3-21



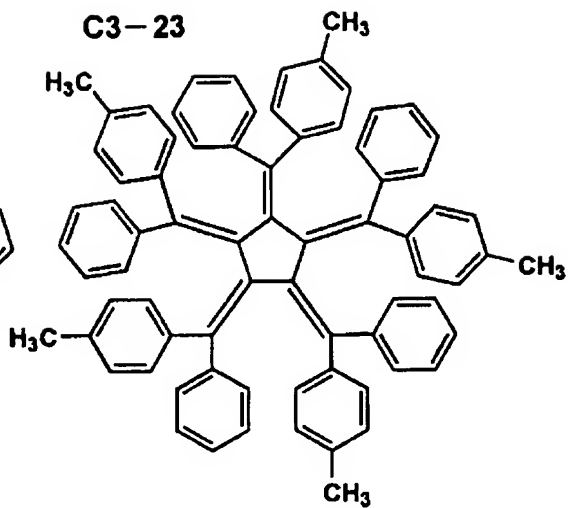
[0537]

[Chemical formula 371]

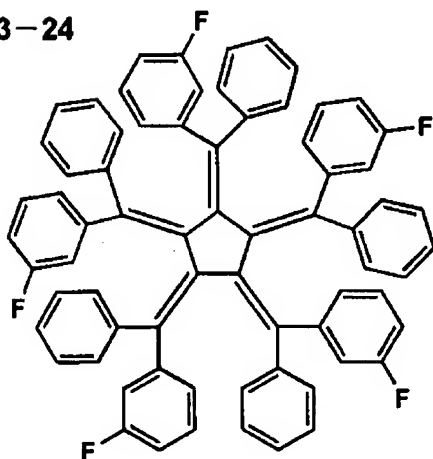
C3-22



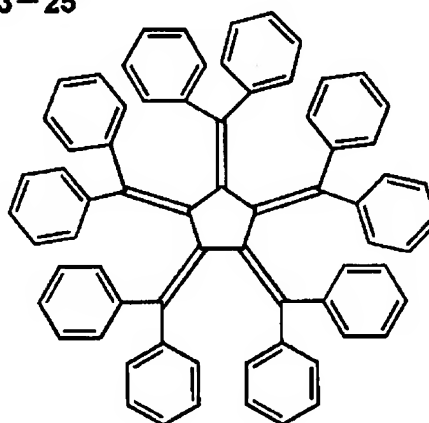
C3-23



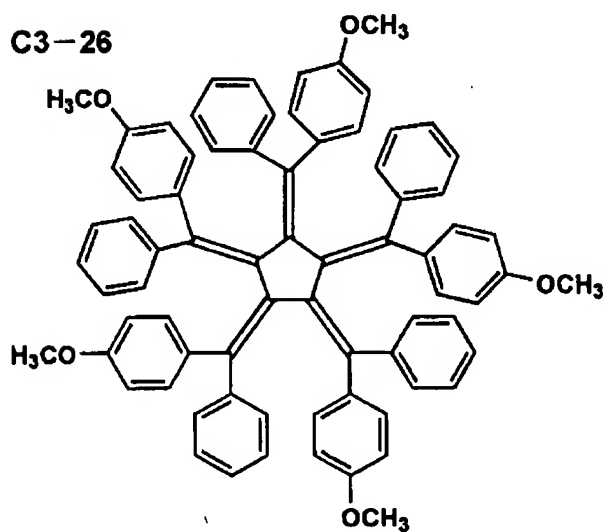
C3-24



C3-25

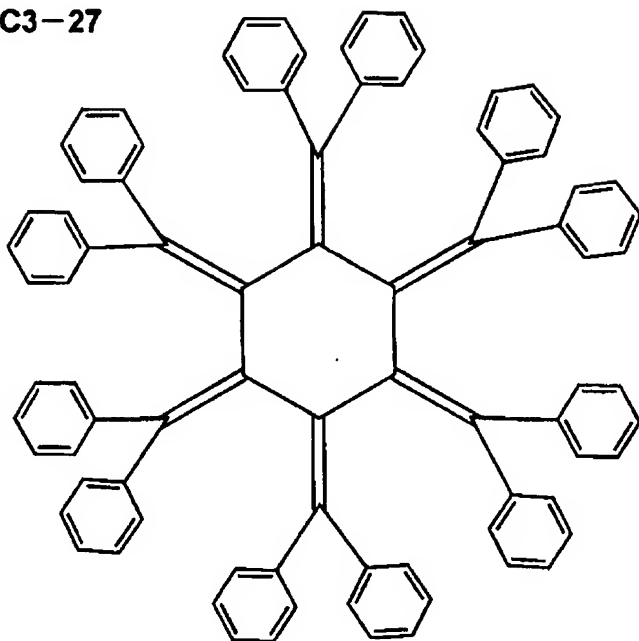
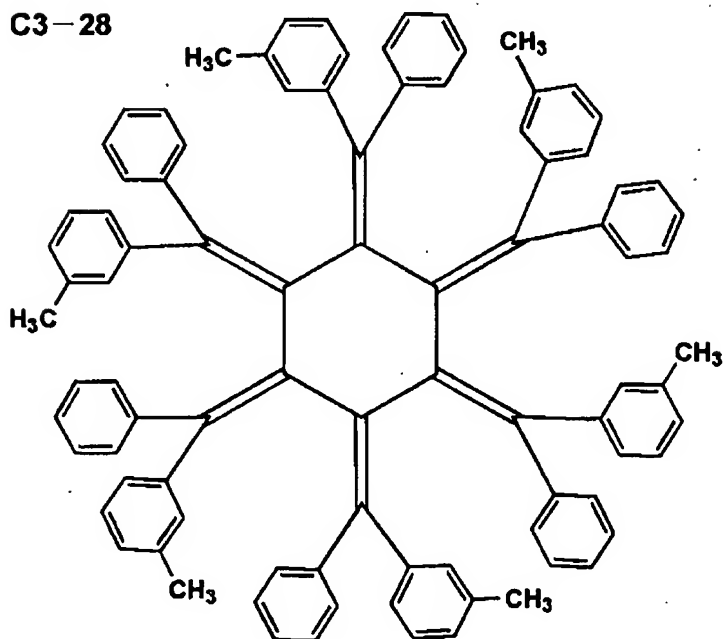


C3-26



[0538]

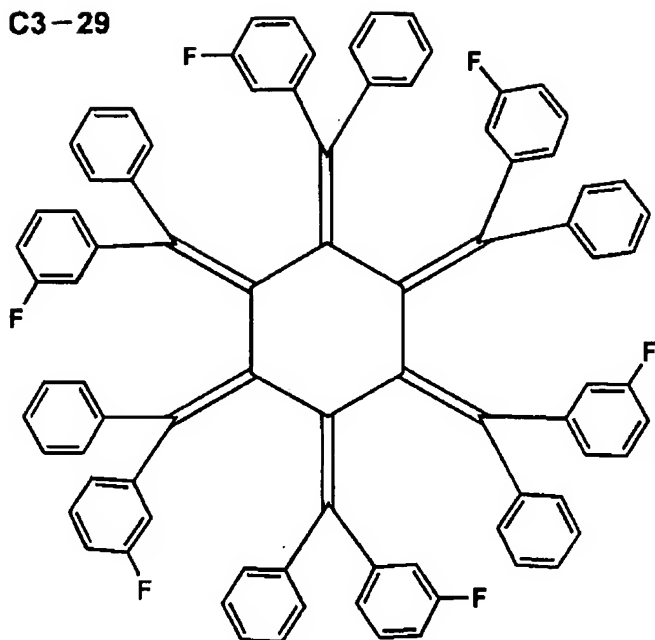
[Chemical formula 372]

**C3-27****C3-28**

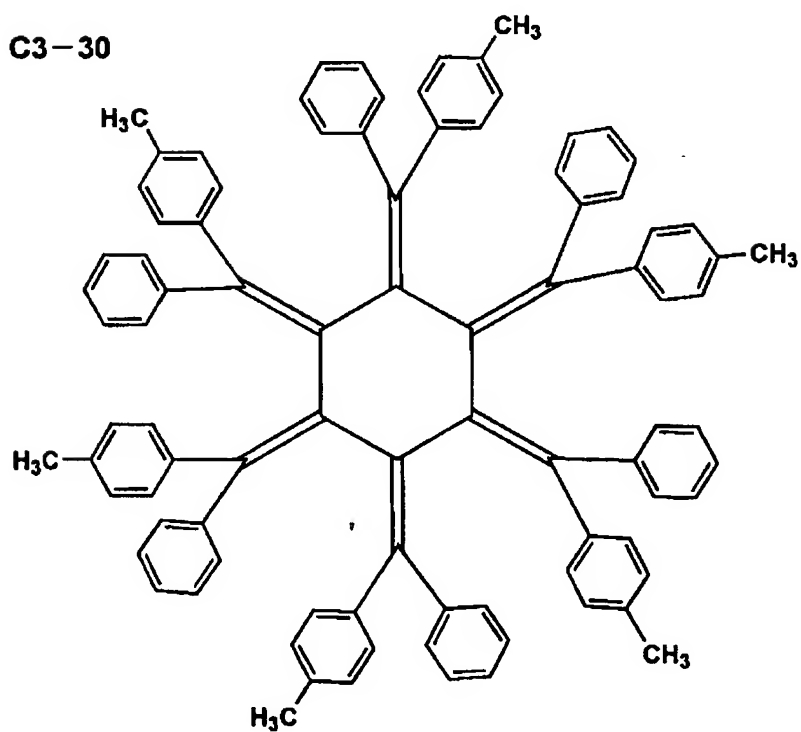
[0539]

[Chemical formula 373]

C3-29



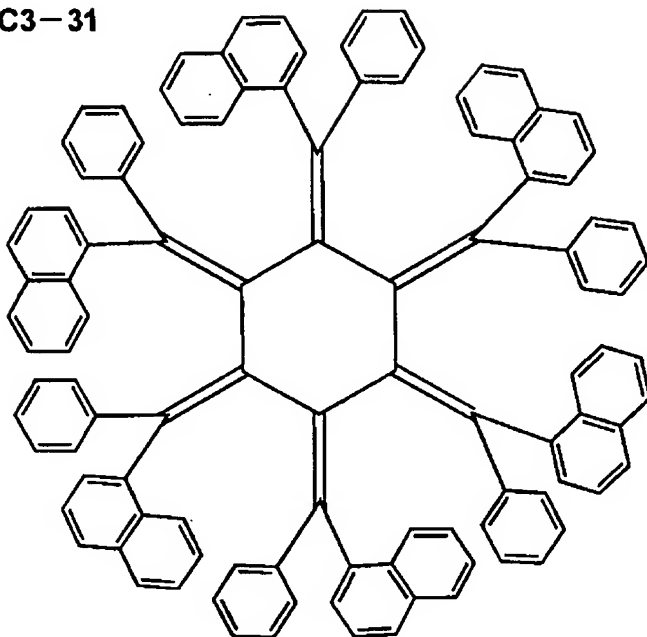
C3-30



[0540]

[Chemical formula 374]

**C3-31**



[0541]The compound denoted by the general formula (C4-1) of this invention below is explained in detail.

[0542]In a general formula (C4-1), the divalent aromatic hydrocarbon group or aromatic heterocycle group which may have a substituent may be expressed,  $Ar_1$  may differ from  $Ar_2$ , respectively, or it may be the same. As an aromatic hydrocarbon group, they are mentioned by 1,4-phenylene, 1,4-naphthylene, 1,6-naphthylene, 4,4'-biphenylene etc., and, [ as an aromatic heterocycle group ] 5,5'-(2,2')-bibenzothiazole, 5,5'-(2,2')-bibenzimidazole, 1,3,4-oxadiazolyl, 4,7-benzothiazolyl, 4,7-benzotriazolyl, 4,7-benzoxadiazolyl, 4,7-benzotriazolyl etc. are mentioned. Alkyl groups (a methyl group, an ethyl group, a trifluoromethyl group, etc.), alkoxy groups (methoxy group etc.), halogen atoms (a fluorine atom, a chlorine atom, etc.), and aryl

groups (phenyl group etc.) are mentioned preferably as a substituent.

[0543] $R_1 - R_{12}$  express independently the alkyl groups (a methyl group, an ethyl group, a trifluoromethyl group, etc.) which are not replaced [ a hydrogen atom, substitution, or ], cycloalkyl machines (cyclohexyl group etc.), alkoxy groups (methoxy group etc.), or halogen atoms (a fluorine atom, a chlorine atom, etc.), respectively.

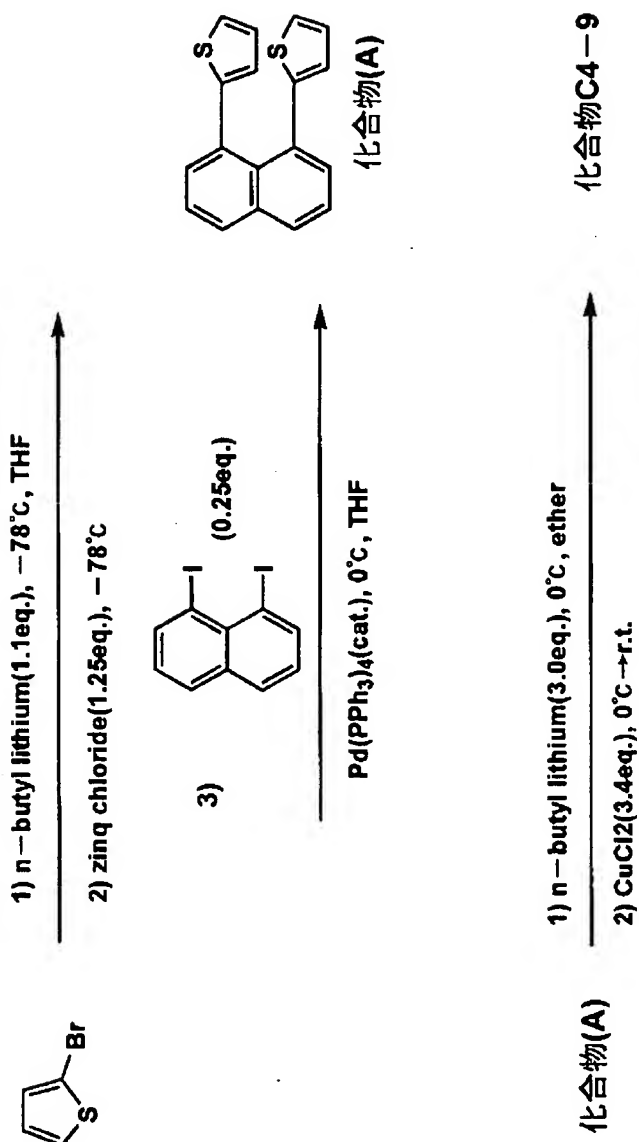
[0544]Next, the typical synthetic example of a compound denoted by the general formula (C4-1) of this invention is described.

[0545]Composition of a [synthetic example] compound (C4-9)

[0546]



[Chemical formula 375]



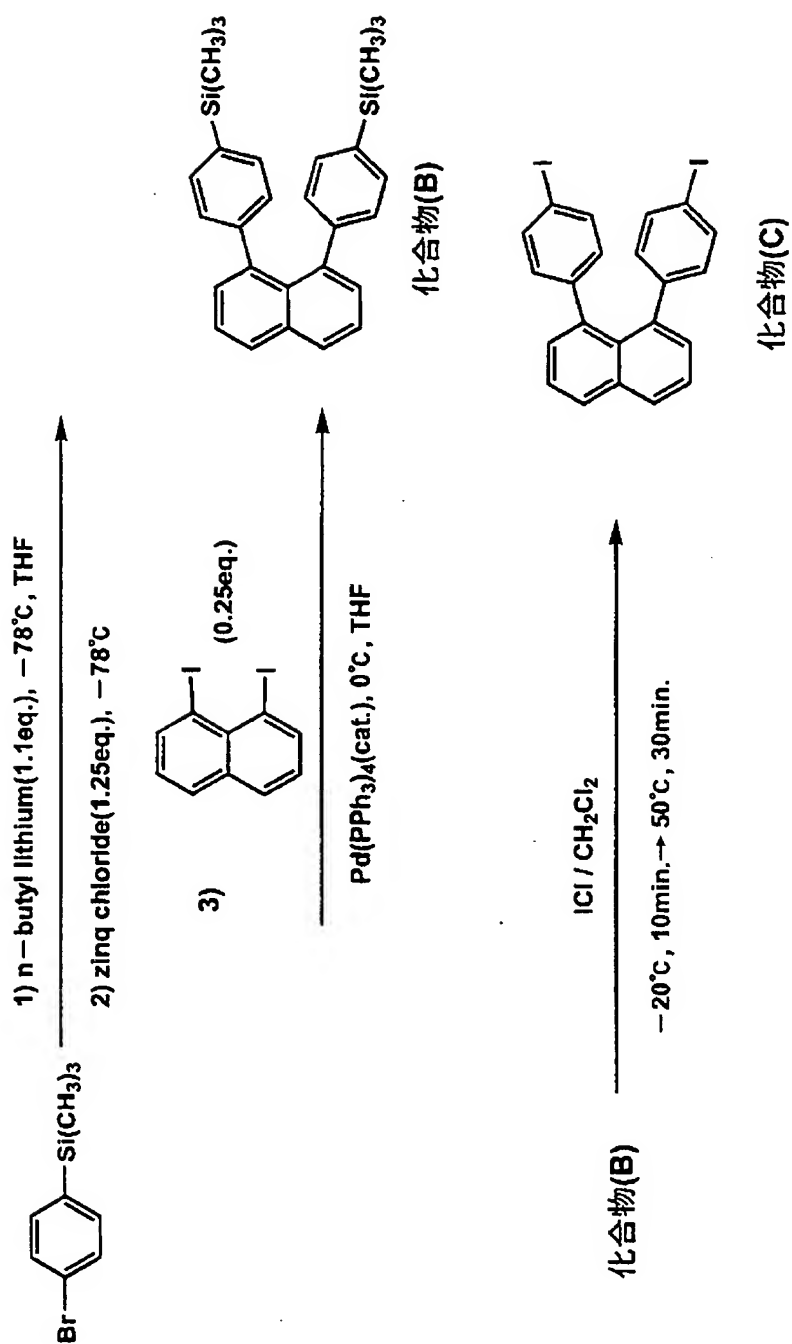
[0547] 15.0 g of 2-bromo CHIOFEN was dissolved in 200 ml of drying-under nitrogen atmosphere tetrahydro frans, 67.5 ml of n-butyl lithium hexane (1.5 mol/L) solution was dropped at -78 \*\*, and the zinc chloride 15.7g was added after 30-minute churning. After 30-minute churning, it \*\*\*\*, after adding 8.74 g of 1 and 8-diiodo NAFUTAREN, and 200 mg of tetrakistriphenyl phosphinepalladium, After agitating at room temperature for 20 hours, reaction solution was extracted, dried and condensed and 3.20g (48% of \*\*\*\*) of compounds (A) were

obtained by refining by column chromatography. Next, 3.0 g of compounds (A) were dissolved in 100 ml of drying-under nitrogen atmosphere ether, and after dropping 20.6 ml of n-butyl lithium hexane (1.5 mol/L) solution and agitating it at 0 °C for 30 minutes, copper chloride (II) 4.71g was added and it was allowed to warm to room temperature. After extracting, drying and condensing reaction solution, 1.05g (18% of yield) of compounds (C4-9) were obtained as re-crystallizing.

[0548]Composition of a [synthetic example] compound (C4-3)

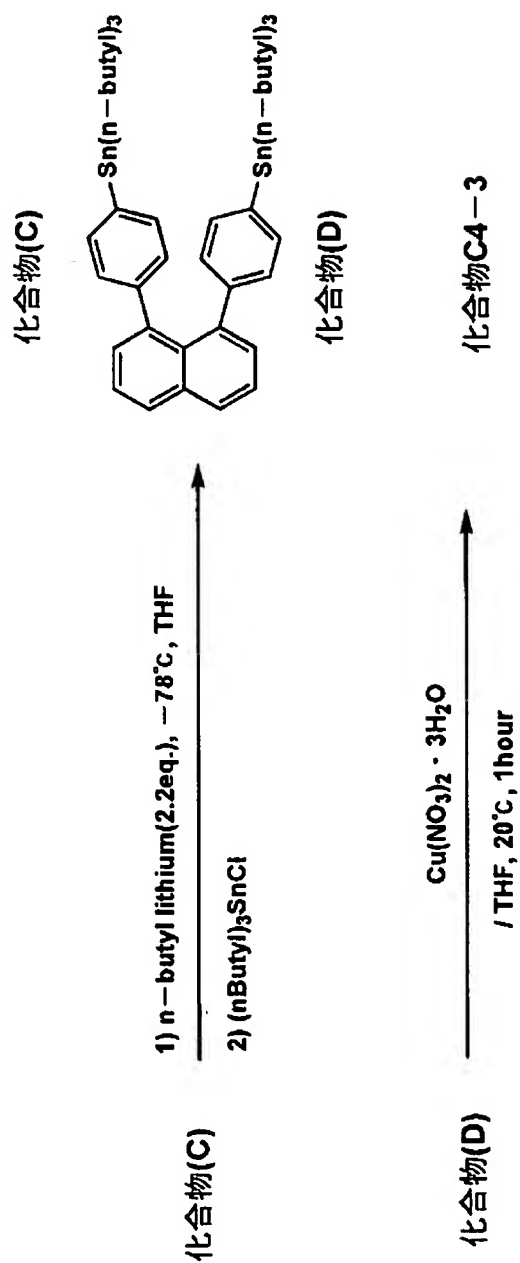
[0549]

[Chemical formula 376]



[0550]

[Chemical formula 377]



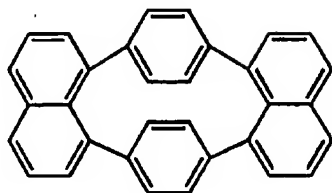
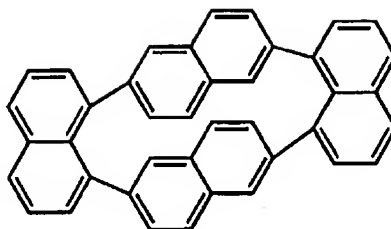
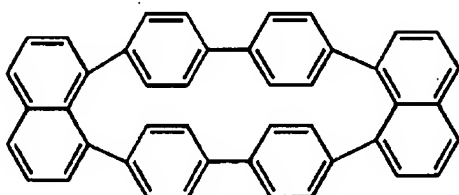
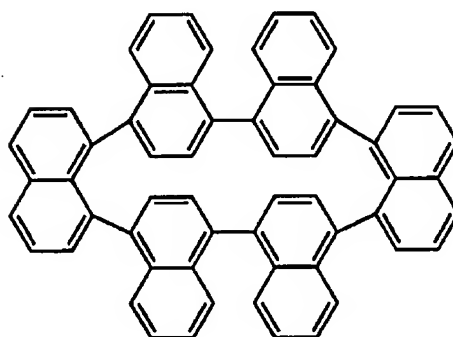
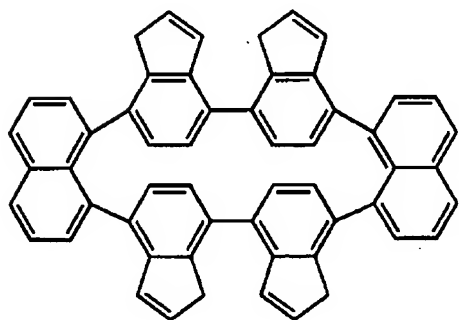
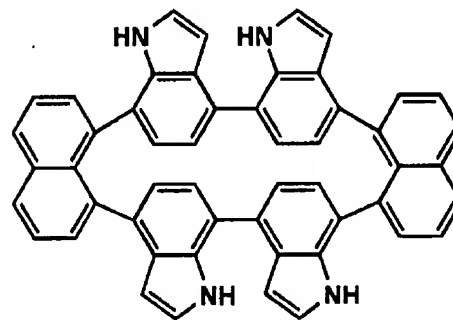
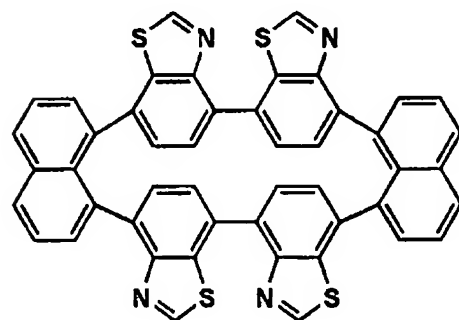
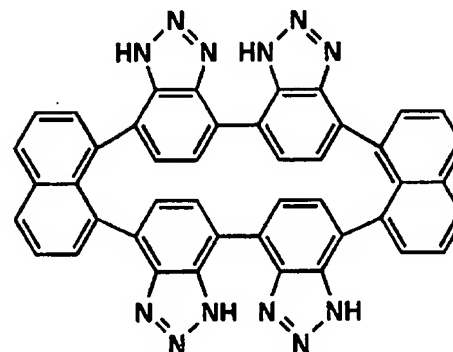
[0551]The 1-bromo 4-trimethylsilyl benzene 22.9g was dissolved in 300 ml of drying-under

nitrogen atmosphere tetrahydro frans, 80 ml of n-butyl lithium hexane (1.5 mol/L) solution was dropped at -78 \*\*, and the zinc chloride 17.7g was added after 30-minute churning. After 30-minute churning, it \*\*\*\*, after adding 9.50 g of 1 and 8-diiodo NAFUTAREN, and 3.00 g of tetrakis(triphenyl phosphine)palladium, After agitating at room temperature for 15 hours, reaction solution was extracted, dried and condensed and 6.37g (60% of \*\*\*\*) of compounds (B) were obtained by refining by column chromatography. 6.37 g of compounds (B) were dissolved in 100 ml of carbon tetrachlorides, 1.5 ml of a little salt-sized iodine was added at -20 \*\*, and it \*\*\*\* (ed) at 50 \*\* after that, and agitated for 30 minutes, and 4.90g (74% of \*\*\*\*) of compounds (C) were obtained by extracting, drying and condensing reaction solution. Next, 4.9 g of compounds (C) were dissolved in 100 ml of drying-under nitrogen atmosphere tetrahydro frans, 13.5 ml of n-butyl lithium hexane (1.5 mol/L) solution was dropped at -78 \*\*, 12.5 ml of bird (n-butyl) chlorination \*\*\*\* were added after 30-minute churning, and it \*\*\*\*(ed) to room temperature. Reaction liquid was extracted, dried and condensed and 6.00g (76% of \*\*\*\*) of compounds (D) were obtained by refining by column chromatography. 6.00 g of compounds (D) were dissolved in a 100-ml tetrahydro franc, the cupric nitrate 3 hydrate 3.72g was added, and it \*\*\*\*(ed) to room temperature. After 1-hour churning, after extracting, drying and condensing reaction solution, 1.60g (41% of \*\*\*\*) of compounds (C4-3) were obtained as re-crystallizing.

[0552]Although the example of a compound denoted by the general formula (C4-1) in this invention below is shown, this invention is not limited to these.

[0553]

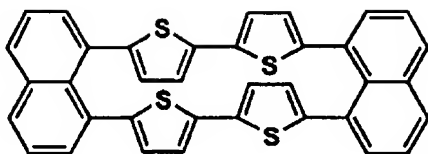
[Chemical formula 378]

**C4-1****C4-2****C4-3****C4-4****C4-5****C4-6****C4-7****C4-8**

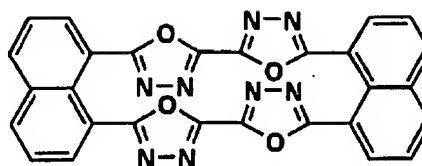
[0554]

[Chemical formula 379]

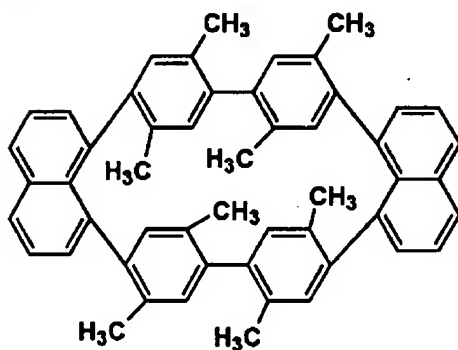
C4-9



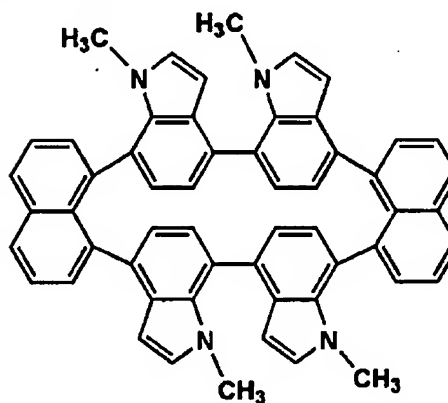
C4-10



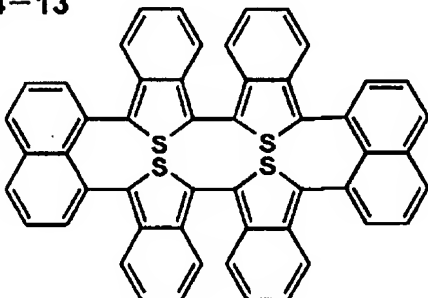
C4-11



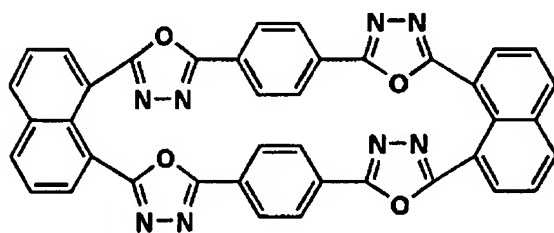
C4-12



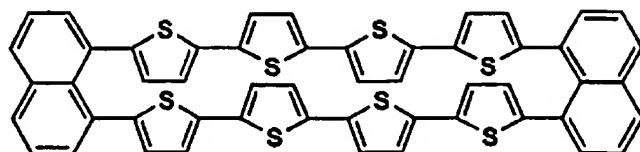
C4-13



C4-14



C4-15





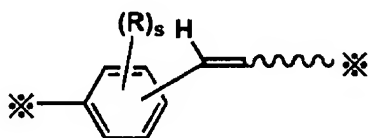
[0555]The compound denoted by the general formula (C5-1) and general formula (C5-2) of this invention below is explained in detail.

[0556]In a general formula (C5-1),  $S_1$  and  $S_2$  express a styryl machine, respectively. A styryl machine is denoted by a general formula (C5-3).

[0557]

[Chemical formula 380]

一般式(C5-3)

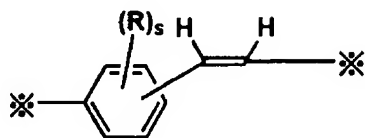


[0558]R expresses a substituent among a formula, s expresses the integer of 0-4, and \* expresses a connecting part. Two or more  $S_1$  and  $S_2$  may be respectively the same, or may differ from each other. The Sis type or a transformer type may be sufficient as a double connecting part. The wavy line of a general formula (C5-3) means expressing the case where general formulas (C5-3) are both a general formula (C5-4) and a general formula (C5-5).

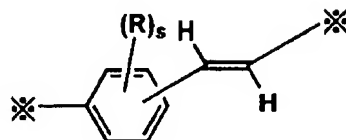
[0559]

[Chemical formula 381]

一般式(C5-4)シス型



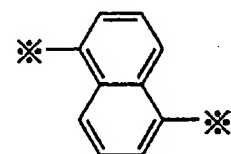
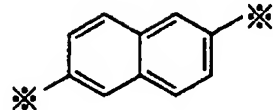
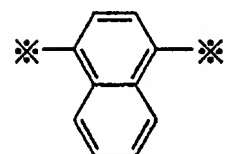
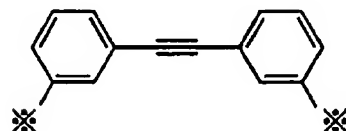
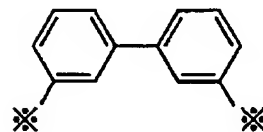
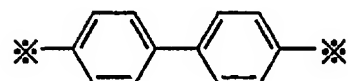
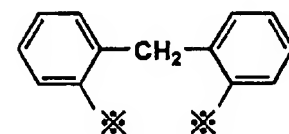
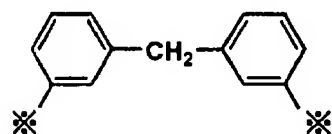
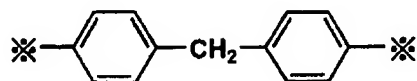
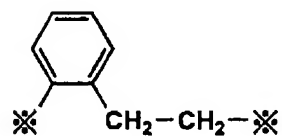
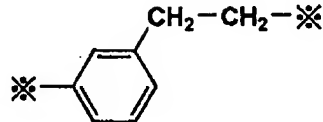
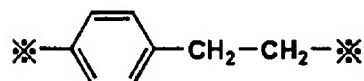
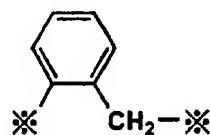
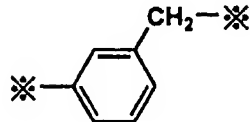
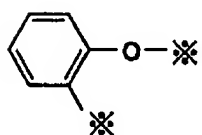
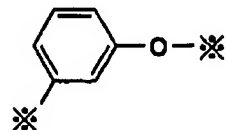
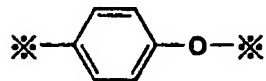
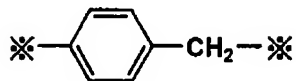
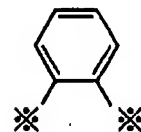
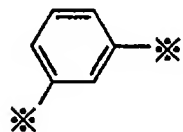
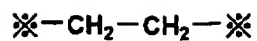
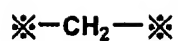
一般式(C5-5)トランス型



[0560] In the general formula (C5-1),  $L_1$  and  $L_2$  may express a divalent connection machine, may express the following connection machines preferably, and may have a substituent respectively. (\* expresses a binding site.)

[0561]

[Chemical formula 382]



[0562]As a substituent of an above-mentioned connection machine, although there is no limitation in particular, alkyl groups (a methyl group, an ethyl group, a trifluoromethyl group, etc.), alkoxy groups (methoxy group etc.), halogen atoms (a fluorine atom, a chlorine atom, etc.), and aryl groups (phenyl group etc.) are mentioned.

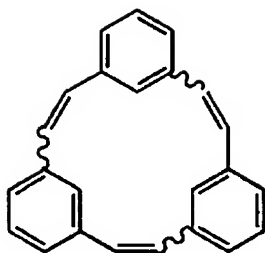
[0563]In a general formula (C5-2),  $Ar_1 - Ar_3$  may express the divalent Ally Wren machine, and may differ from each other respectively, or may be the same. As a divalent Ally Wren machine, 1,2-phenylene, 1,3-phenylene, 1,4-phenylene, 1, 4-naphthylene, 2,6-naphthylene group, 4, and 4'-biphenylene, 3, and 3'-biphenylene, 3, and 6-phenan Indanthrene is mentioned.  $q$  expresses the integer of 0-6. The wavy line of a general formula (C5-2) is synonymous with the wavy line in the general formula (C5-3) mentioned above.

[0564]Although the example of a compound denoted by the general formula (C5-1) and general formula (C5-2) in this invention below is shown, this invention is not limited to these.

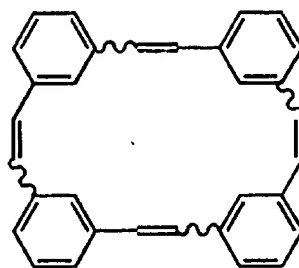
[0565]

[Chemical formula 383]

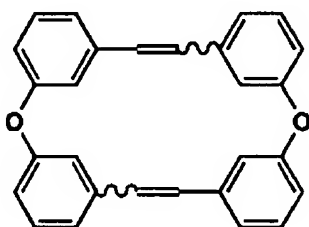
C5-1



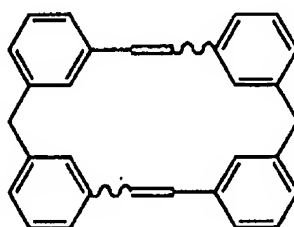
C5-2



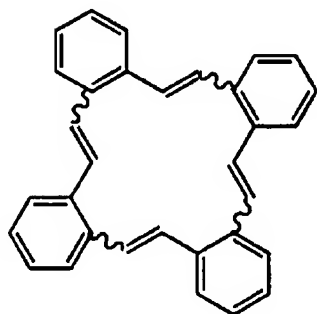
C5-3



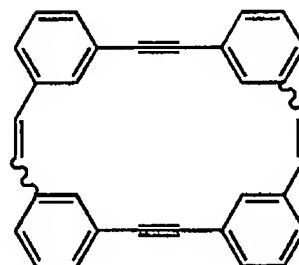
C5-4



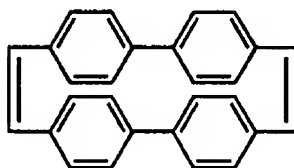
C5-5



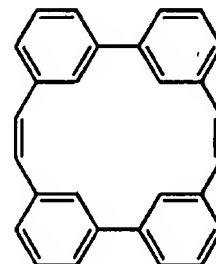
C5-6



C5-7



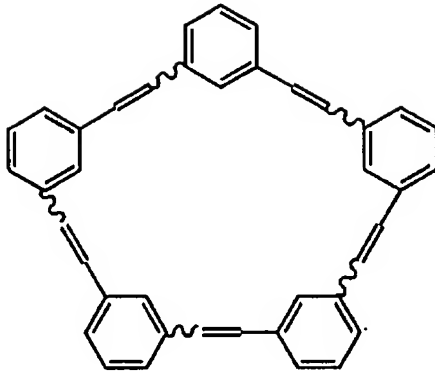
C5-8



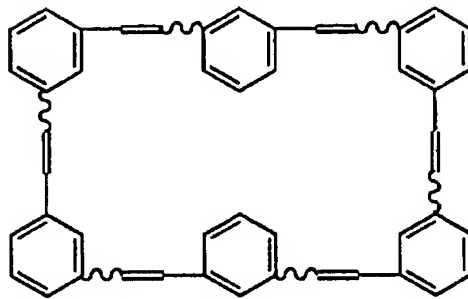
[0566]

[Chemical formula 384]

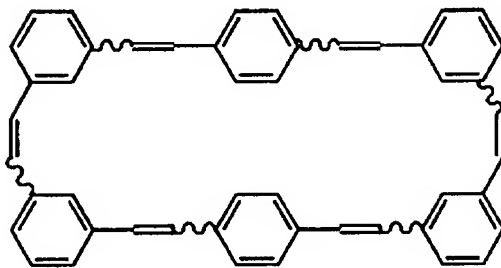
C5-9



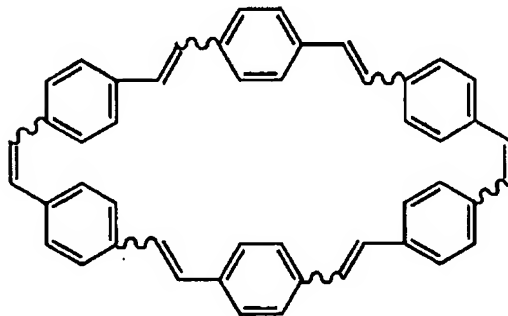
C5-10



C5-11



C5-12

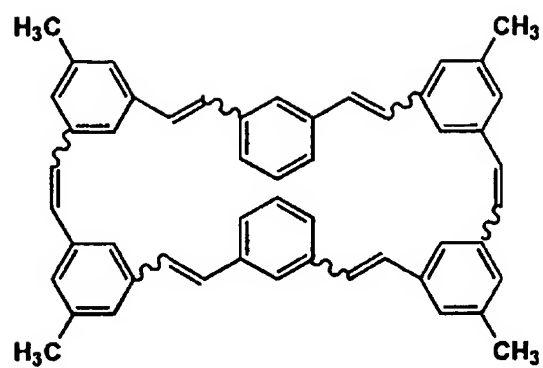


[0567]

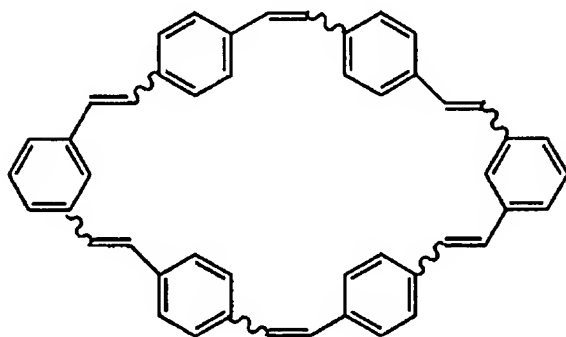
[Chemical formula 385]



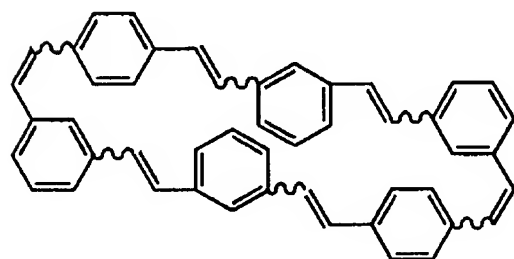
C5-13



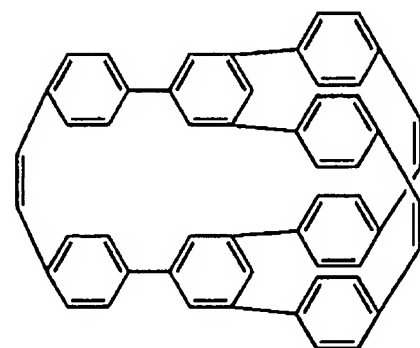
C5-14



C5-15



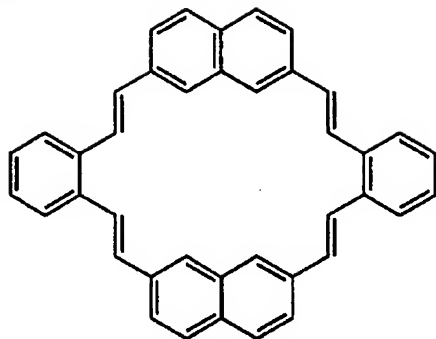
C5-16



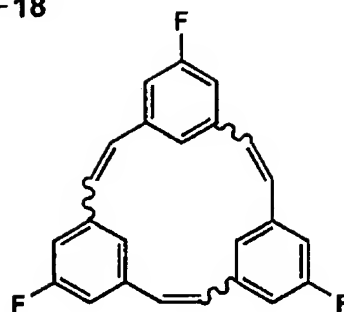
[0568]

[Chemical formula 386]

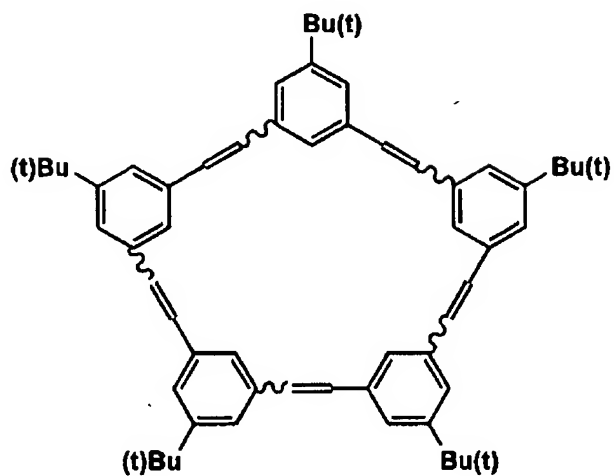
C5-17



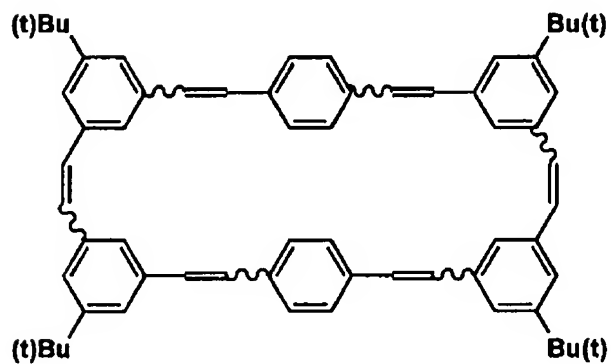
C5-18



C5-19



C5-20



[0569]Next, the typical synthetic example of a compound denoted by the general formula (C5-1) and general formula (C5-2) of this invention is described.

[0570]The synthetic example (compound (C5-1)) <composition of compound (A)> 3-bromo BENJIRU phosphonium salt 5.5g Under a nitrogen atmosphere, It dissolved in DMSO50ml, and after adding 1.33 g of potassium t-butoxide under churning and agitating for 1 minute at room temperature, 657 mg of 1 and 3-diformyl benzene (isophthal aldehyde) was added, and it opens and condensed [ extracted, dried and ] in water. This was refined by column chromatography and 770 mg (36% of \*\*\*\*) of compounds (A) were obtained.

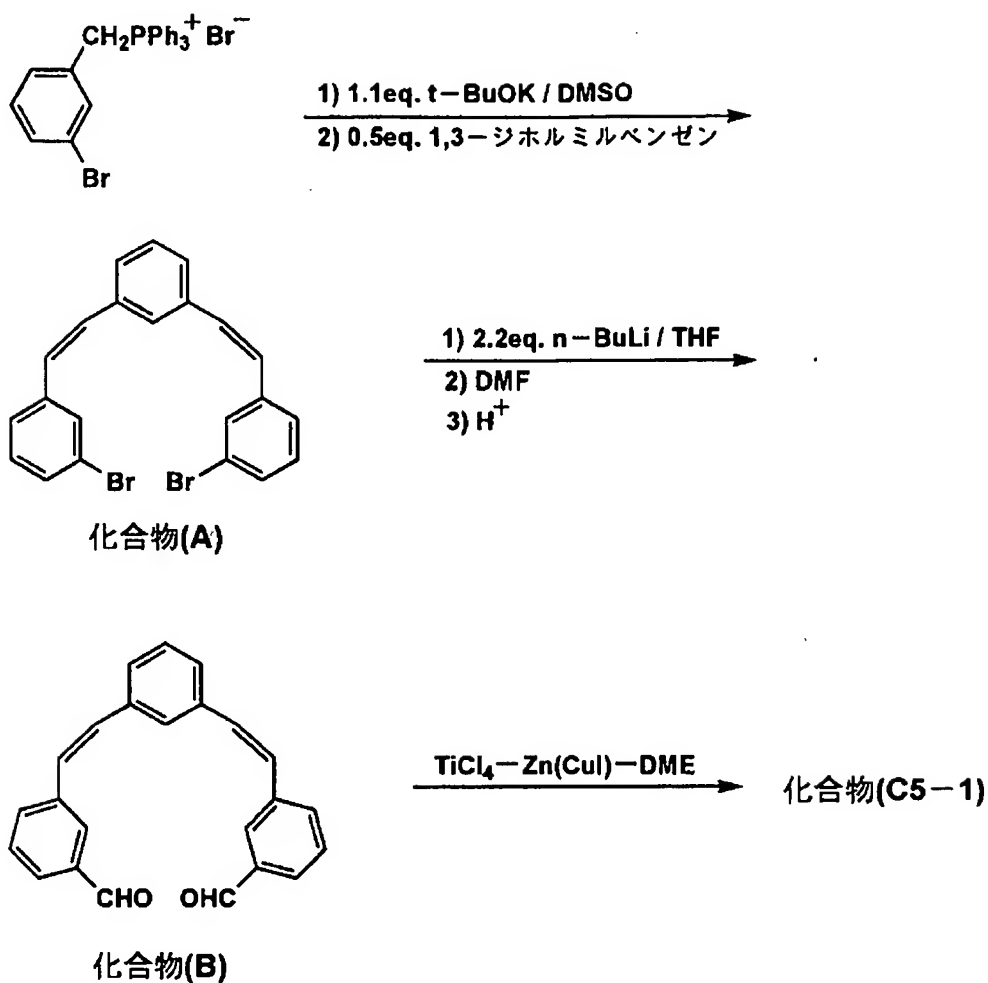
[0571]<Composition of a compound (B)> 1.17 g of compounds (A) were dissolved in THF30ml under a nitrogen atmosphere, 3.9 ml of n-butyl lithium hexane solutions were dropped at -78 \*\*, DMF4.4ml was added after 30-minute churning, and it \*\*\*\*(ed) to room temperature. It opened in water, reaction solution was extracted, dried and condensed, it refined by column chromatography, and 888 mg (\*\*\*\*: almost quantitative) of compounds (B) were obtained.

[0572]<Composition of a compound (C5-1)> Bottom drying by heating of decompression of the zinc 1.3g and the copper iodide 0.13g was carried out, and after carrying out nitrogen substitution, 30 ml of drying dimethoxyethane was added, and 1.1 ml of titanium tetrachloride was added continuously. After the reaction became quiet, it ice-cooled, after flowing back for 3 hours, and the solution which melted 338 mg of compounds (B) in 10 ml of dimethoxyethane at 0 \*\* was dropped. After the end of dropping, at room temperature, it agitated, and it flowed back continuously for 6 hours all night. To the alumina column, reaction solution was refined by column chromatography, after extracting, drying and condensing, through and, and the compound (C5-1) was made into the end of non-color powder, and was obtained 226 mg (74% of \*\*\*\*).

[0573]The synthetic process of a compound (C5-1) is shown below.

[0574]

[Chemical formula 387]



[0575]The synthetic example (compound (C5-12)) <composition of compound (C)> 4-bromo BENJIRU phosphonium salt 4.2g Under a nitrogen atmosphere, It dissolved in DMSO40ml, and after adding 1.01 g of potassium *t*-butoxide under churning and agitating at room temperature for 1 minute, 502 mg of 1 and 4-diformyl benzene (PARAFUTARU aldehyde) was added, and it opens and condensed [ extracted, dried and ] in water. This was refined by column chromatography and 490 mg (30% of \*\*\*\*) of compounds (C) were obtained.

[0576]<Composition of a compound (D)> 2.02 g of compounds (C) were dissolved in THF60ml

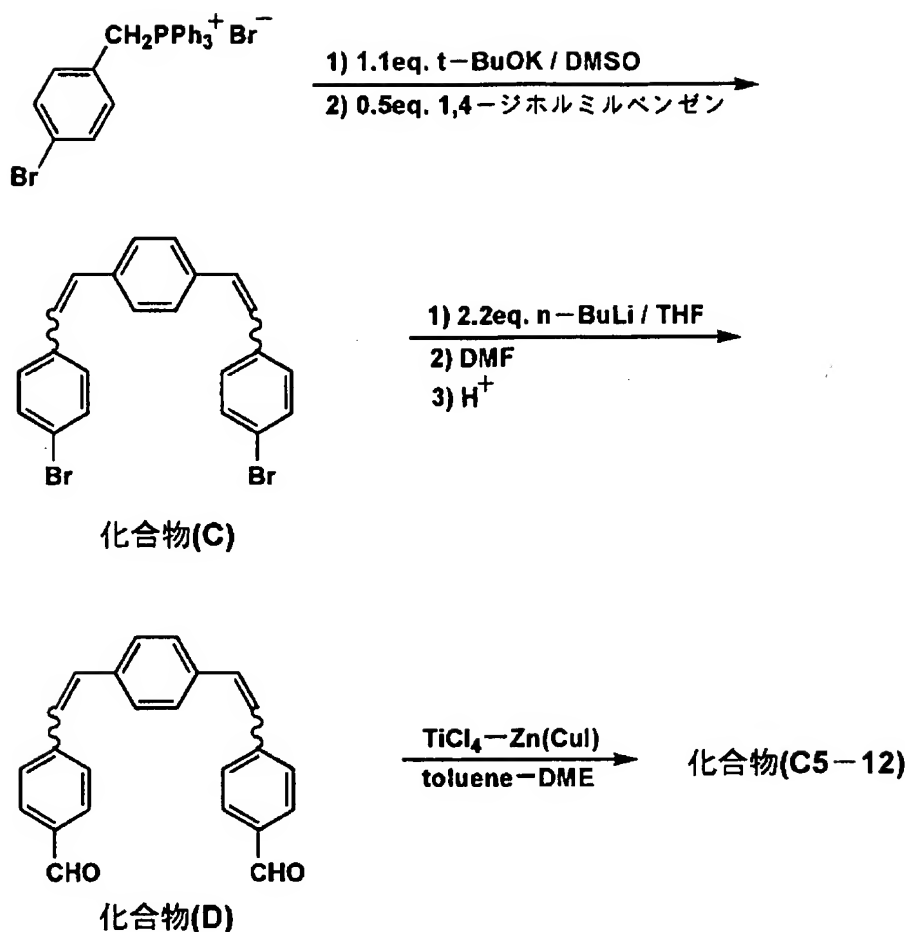
under a nitrogen atmosphere, 6.80 ml of n-butyl lithium hexane solutions were dropped at -78 \*\*, DMF 7.6 ml was added after 30-minute churning, and it \*\*\*\*(ed) to room temperature. It opened in water, reaction solution was extracted, dried and condensed, it refined by column chromatography, and 1.45 g (93% of \*\*\*\*) of compounds (D) were obtained.

[0577]<Composition of a compound (C5-12)> Bottom drying by heating of decompression of the zinc 3.9 g and the copper iodide 0.39 g was carried out, and after carrying out nitrogen substitution, 45 ml of drying dimethoxyethane and the mixed solvent of 45 ml of drying toluene were added, and 3.3 ml of titanium tetrachloride was added continuously. After the reaction became quiet, it ice-cooled, after flowing back for 3 hours, and the solution which melted 1.01 g of compounds (D) in 30 ml of dimethoxyethane at 0 \*\* was dropped. At room temperature, it agitated, and it flowed back continuously for 6 hours all night after the end of dropping. To the alumina column, reaction solution was refined by column chromatography, after extracting, drying and condensing, through and, and the compound (C5-12) was used as yellow powder, and was obtained 484 mg (53% of \*\*\*\*).

[0578]The synthetic process of a compound (C5-12) is shown below.

[0579]

[Chemical formula 388]



[0580]The synthetic example (compound (C5-20)) <composition of compound (E)> 3-bromo 5-t-butylbenzyl phosphonium salt 2.4g Under a nitrogen atmosphere, It dissolved in DMSO30ml, and after adding 500 mg of potassium t-butoxide under churning and agitating at room temperature for 1 minute, 270 mg of 1 and 4-diformyl benzene (PARAFUTARU aldehyde) was added, and it opens and condensed [ extracted, dried and ] in water. This was refined by column chromatography and 1.06g (96% of \*\*\*\*) of compounds (E) were obtained.

[0581]<Composition of a compound (F)> 1.06 g of compounds (E) were dissolved in THF30ml under a nitrogen atmosphere, 2.83 ml of n-butyl lithium hexane solutions were dropped at -78 \*\*, DMF3.2ml was added after 30-minute churning, and it \*\*\*\*(ed) to room temperature. It

opened in water, reaction solution was extracted, dried and condensed, it refined by column chromatography, and 823 mg (95% of \*\*\*\*) of compounds (F) were obtained.

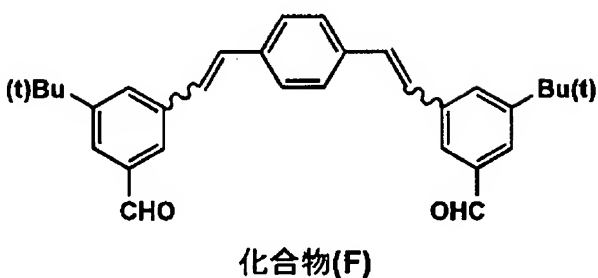
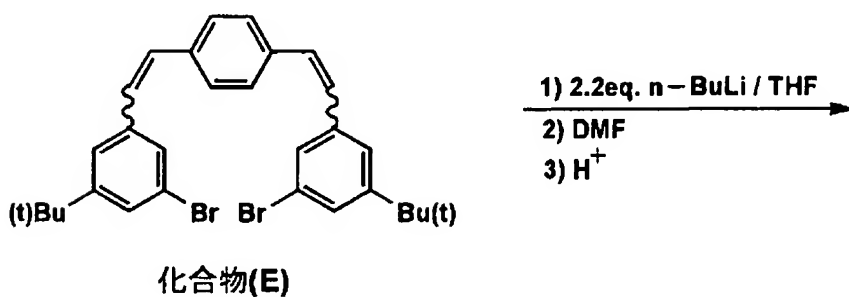
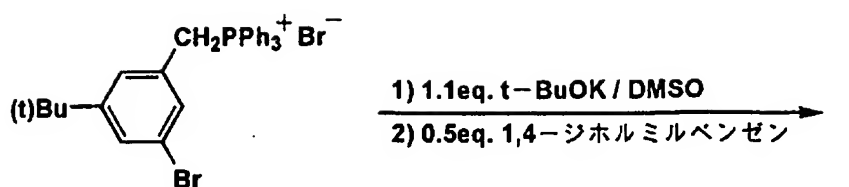
[0582]<Composition of a compound (C5-20)> Bottom drying by heating of decompression of the zinc 1.3g and the copper iodide 0.13g was carried out, and after carrying out nitrogen substitution, 15 ml of drying dimethoxyethane and the mixed solvent of 15 ml of drying toluene were added, and 1.1 ml of titanium tetrachloride was added continuously. After the reaction became quiet, it ice-cooled, after flowing back for 3 hours, and the solution which melted 414 mg of compounds (F) in 10 ml of dimethoxyethane at 0 \*\* was dropped. At room temperature, it agitated, and it flowed back continuously for 6 hours all night after the end of dropping. To the alumina column, reaction solution was refined by column chromatography, after extracting, drying and condensing, through and, and the compound (C5-20) was made into the end of non-color powder, and was obtained 197 mg (51% of \*\*\*\*).

[0583]The synthetic process of a compound (C5-20) is shown below.

[0584]

[Chemical formula 389]





[0585]Subsequently, furthermore it is used in this invention, another fluorogenic compound is explained.

[0586]The fluorogenic compound which this invention persons can use for organic electroluminescence, The result of having repeated examination wholeheartedly about the fluorogenic compound used especially as a host compound, When it had found out that there is a certain correspondence relation to the ratio (N/C) of the luminescence luminosity of an

element and the number of nitrogen atoms in the molecule of a fluorogenic compound compound to the number of carbon atoms and N/C, as a result, took a to some extent small value, the further improvement in luminescence luminosity was accepted. This will be presumed to be what a limit is regarded as by luminescence luminosity by a certain operation of the nitrogen atom in the molecule of a host compound if N/C becomes to some extent large. Therefore, in order to, have raised the luminescence luminosity of the organic EL device which used the phosphorescence compound for the dopant for example, it turned out that it is effective to make N/C of a host compound small.

[0587]In this invention, a fluorogenic compound is a compound in which luminescence from the excitation single paragraph which is in the state of anti-parallel [ two electron spins ] is observed by light excitation, and a phosphorescence compound is a compound in which luminescence from the excitation Mie paragraph which is in the state where two electron spins are parallel is observed by light excitation. It is thought that an excitation triplet state is formed in this invention in room temperature (15-30 \*\*) with the phosphorescence compound of a description here of the energy transmission from the excitation singlet state or excitation triplet state of said fluorogenic compound. Usually, although it was thought that phosphorescence luminescence could not be observed only at 77-degree K low temperature, After the compound which can observe phosphorescence luminescence at room temperature is found out in recent years, Synthetic examination of many compounds is carried out the center [ a heavy metal complex system compound, such as an iridium complex system, ] (for example, S.Lamansky et al., J.Am.Chem.Soc., 123 volumes, 4304 pages, 2001).

[0588]In this invention, the fluorescence maximum wavelength of a fluorogenic compound is the local maximum when the fluorescence spectrum of a vapor deposition film when 100 nm of fluorogenic compounds are vapor-deposited on a glass substrate is measured.

[0589]In the organic electroluminescence element which has a luminous layer containing both a fluorogenic compound and a phosphorescence compound in this invention, Since improvement in luminescence luminosity was specifically accepted when the ratio (N/C) of the number of nitrogen atoms in a molecule to the number of carbon atoms used together 0.05 or less or more 0 host compound with a phosphorescence compound, As for the fluorogenic compound combined as a host of a phosphorescence compound, in this invention, it is preferred that the ratio (N/C) of the number of nitrogen atoms in this molecule to the number of

carbon atoms is or more 0.05 or less thing. Although it is not so clear about this Reason, if the ratio (N/C) of the number of nitrogen atoms to the number of carbon atoms becomes to some extent large as mentioned above, it will be presumed because a limit is looked at by luminescence luminosity by a certain operation of the nitrogen atom in the molecule of a host compound.

[0590]In this invention, a luminescence life becomes it long specifically that the ratio (N/C) of the number of nitrogen atoms in this molecule to the number of carbon atoms is larger than 0, and the fluorogenic compound combined as a host of a phosphorescence compound is 0.03 or less thing, and it is desirable. Although it is preferred that it is with the host compound which has a nitrogen atom in order to have the above luminescence life to some extent although it is not so clear about this Reason, If the ratio (N/C) of the number of nitrogen atoms to the number of carbon atoms becomes to some extent large, it will be presumed because a limit is seen by the life by a certain operation of a nitrogen atom.

[0591]In this invention, the phosphorescence luminescence maximum wavelength of the phosphorescence compound incorporated as a dopant needs to be a long wave more compared with the fluorescence maximum wavelength of a host's fluorogenic compound. The organic electroluminescence (EL) element using luminescence by the excitation Mie paragraph of the phosphorescence compound which this incorporated as a dopant can be obtained. Therefore, the luminescence maximum wavelength obtained by electric field luminescence in the state where the element was constituted is a long wave from the independent fluorescence maximum wavelength (local maximum when a fluorescence spectrum is measured by a vapor deposition film when 100 nm of fluorogenic compounds were vapor-deposited on glass) of the fluorogenic compound used as this host.

[0592]As for 390 nm - 410 nm, in this invention, it is desirable still more preferred that the fluorescence maximum wavelength of the fluorogenic compound used as a host compound is 350 nm to 440 nm.

[0593]Since heat stability is inferior when a molecular weight is small, the organic materials of a low-molecular system may not have enough luminescence luminosity. As for the fluorogenic compound which serves as a host of the phosphorescence compound used for this invention,

it is preferably used from a viewpoint of heat stability that a molecular weight is 600 or more.

[0594]Phosphorescence quantum \*\*\*\* in solution of the phosphorescence compound of this invention is 0.001 or more in 25 \*\*. Preferably, it is 0.01 or more. It is 0.1 or more preferably.

[0595]Below, the measuring means of quantum \*\*\*\*  $\phi_p$  of an excitation triplet state and its theory are described.

[0596]To a ground state, excitation energy is lost in a kinetic constant,  $k_{sn}$ , and  $k_f$  by unradiated changes and fluorescence discharge from an excitation singlet state, respectively. In addition, the changes to an excitation triplet state occur and are deactivated in a kinetic constant and  $k_{isc}$ . Here, the life of an excitation singlet state and  $\tau_s$  are defined by the following formula.

[0597] $\tau_s = (k_{sn} + k_f + k_{isc})^{-1}$  and quantum \*\*\*\* of fluorescence, and  $\phi_f$  are defined by the following formula.

[0598]To a ground state, it is deactivated in a kinetic constant,  $k_{tn}$ , and  $k_p$  by unradiated changes and phosphorescence discharge from  $\phi_f = k_f$  and a  $\tau_s$  excitation triplet state, respectively. The life of an excitation triplet state and  $\tau_t$  are defined by the following formula.

[0599] $\tau_t = (k_{tn} + k_p)^{-1}$   $\tau_t$  is a  $10^{-6}$  -  $10^{-3}$  second, and a long thing may amount to several seconds. And quantum \*\*\*\* of phosphorescence and  $\phi_p$  are defined as follows using quantum \*\*\*\* of generation of an excitation triplet state, and  $\phi_{ST}$ .

[0600] $\phi_p = \phi_{ST}$ ,  $k_p$ , and the  $\tau_t$  above-mentioned parameter can be measured by the method of a 398 pages (1992 editions, Maruzen) description of the spectrum II of the 4th

edition experimental science lecture 7. Among the above-mentioned parameter, although phosphorescence quantum \*\*\*\* in the inside of the solution of a phosphorescence compound can be measured using various solvents, it measures in this invention, using a tetrahydro franc as a solvent.

[0601]In the solid parameter Es of the substituent in this invention, it is a substituent constant with defined Taft, for example, is indicated to "the field special number No. 122 Nankodo Co., Ltd. \*\* of the structure-activity relationship chemicals of a medicine." On the basis of a hydrogen atom, Es value said especially by this invention is a value of Es (H= 0), namely, shows the value deducted from Es value defined as Es (CH<sub>3</sub>=0) on the basis of a methyl group 1.24. The typical value is shown in Table 1.

[0602]

[Table 1]

置換基	Es 値
H	0.00
CH <sub>3</sub>	-1.24
C <sub>2</sub> H <sub>5</sub>	-1.31
i-C <sub>3</sub> H <sub>7</sub>	-1.71
t-C <sub>4</sub> H <sub>9</sub>	-2.78
F	-0.46
Cl	-0.97
Br	-1.16
CF <sub>3</sub>	-2.40
CCl <sub>3</sub>	-3.30
OCH <sub>3</sub>	-0.55
OH	-0.55
SH	-1.07
CN	-0.51

[0603]As for the fluorogenic compound used for this invention, it is preferred that the ratio

(N/C) of the number of nitrogen atoms in a fluorogenic compound molecule to the number of carbon atoms uses together with a phosphorescence compound by using as a host compound or more 0 compound which is 0.05 or less. Although luminescence luminosity is higher and the organic EL device excellent also in the luminescence life can be provided by this, In view of another viewpoint, it is useful to use the compound denoted by said general formula (C6-I) - (C6-V) as a host compound used in combination with a phosphorescence compound in this invention.

[0604]The compound denoted by general formula (C6-I) - (C6-V) in this invention below is explained in detail.

[0605]In said general formula (C6-I),  $n$  expresses the integer of 0 to 3, and  $R_1$  and  $R_2$  express a substituent respectively, and as a substituent preferably, Alkyl groups (methyl, ethyl, i-propyl, hydroxyethyl, methoxymethyl, trifluoromethyl, t-butyl, etc.), halogen atoms (fluoride, chlorine, etc.), and alkoxy groups (methoxy and ethoxy  $\alpha$ -i-propoxy, butoxy, etc.) are mentioned. Ar expresses the aromatic hydrocarbon ring which may have a substituent, or an aromatic heterocycle machine, and expresses Naff Chill, binaphthyl, quinolyl, iso quinolyl, benzoxazolyl, benzimidazolyl, etc. preferably. When  $n$  expresses an integer greater than or equal to 2, two or more  $R_1$  and  $R_2$  may be the same, or may differ from each other.

[0606]In a general formula (C6-II),  $n_4$ ,  $n_5$ , and  $n_6$  express the integer of 0 to 7 respectively. One or more  $R_6$ ,  $R_7$ , and  $R_8$  express the substituent respectively chosen from an alkyl group, a cycloalkyl machine, an aryl group, halogen, an alkoxy group, an aryloxy group, and a heterocyclic machine, and a methyl group and especially a naphthyl group are preferred.

[0607]When  $n_4$ - $n_6$  express an integer greater than or equal to 2, two or more  $R_6$  -  $R_8$  may be the same, or may differ from each other.

[0608]In a general formula (C6-III),  $R_{11}$ - $R_{16}$ ,  $X_1$  -  $X_9$  may express a hydrogen atom or a substituent, and may differ from each other, respectively, or may be the same. As a basis denoted by  $R_{11}$  -  $R_{16}$ , alkyl groups (for example, a methyl group, an ethyl group, an isopropyl

group, a trifluoromethyl group, t-butyl group, etc.) are mentioned preferably. However, the total value of each solid parameter  $Es_{R11}$  - the  $Es_{R16}$  value of  $R_{11}$  -  $R_{16}$  fills

$Es_{R11} + Es_{R12} + Es_{R13} + Es_{R14} + Es_{R15} + Es_{R16} \leq -2.0$ . The substituents which adjoin mutually may condense and they may form ring structure. As a substituent denoted by  $X_1$  -  $X_9$ , an alkyl group, an aryl group, a heterocyclic machine, a halogen atom, an alkoxy group, an amino group, etc. are preferred, and, as for especially  $X_2$ ,  $X_5$ , and  $X_8$ , it is still more preferred that they are an aryl group or an amino group (especially diaryl amino group).

[0609]In a general formula (C6-IV),  $R_{101}$  -  $R_{128}$  express a hydrogen atom or a substituent, respectively, and at least one of  $R_{101}$  - the  $R_{104}$  expresses a substituent. When  $R_{101}$  -  $R_{128}$  express a substituent, as the substitution preferably, an alkyl group (for example, a methyl group, an ethyl group, an isopropyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, a perfluoro propyl group, A perfluoro n-butyl group, a perfluoro t-butyl group, t-butyl group, etc., A cycloalkyl machine (for example, a cyclopentyl group, a cyclohexyl group, etc.), aralkyl groups (for example, a benzyl group, 2-FENECHIRU machine, etc.) and an aryl group (for example, a phenyl group.) Alkoxy groups (for example, a methoxy group, an ethoxy basis, an isopropoxy group, a butoxy machine, etc.), aryloxy groups (for example, phenoxy group etc.), arylamino machines, etc. (for example, diphenylamino machine etc.), such as a naphthyl group, p-trill machine, and p-chlorophenyl machine, are mentioned. These bases may be replaced further and, [ as said substituent ] A halogen atom, a hydrogen atom, a trifluoromethyl group, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkylthio group, a dialkylamino group, a dibenzylamino machine, a diaryl amino group, etc. are mentioned.

[0610]In a general formula (C6-IV), as a substituent of  $R_{101}$  -  $R_{104}$ , an alkyl group is preferred and it is most preferred that any two,  $R_{101}$  -  $R_{104}$ , or four are a methyl group especially.

[0611]In a general formula (C6-V),  $R_{201}$  -  $R_{206}$  express a hydrogen atom or a substituent, respectively. When  $R_{201}$  -  $R_{206}$  express a substituent, the substituent currently mentioned in the example of said  $R_{101}$  -  $R_{128}$  as the substituent is preferred. It is an aryl group or a substitution aryl group, and they are a phenyl group or a substitution phenyl group most

preferably.

[0612]Also in the compound denoted by general formula (C6-I) - (C6-V), it is preferred that the ratio (N/C) of the number of nitrogen atoms in a molecule to the number of carbon atoms is 0.05 or less, and it is most preferred that the ratio (N/C) of the number of nitrogen atoms in a molecule to the number of carbon atoms is 0.03 or less.

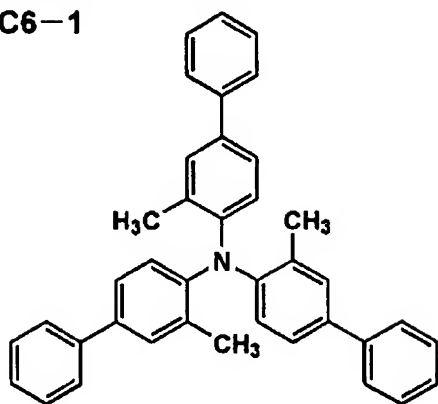
[0613]Although the example of a compound denoted by general formula (C6-I) - (C6-V) in this invention below is shown, it is not limited to these.

[0614]

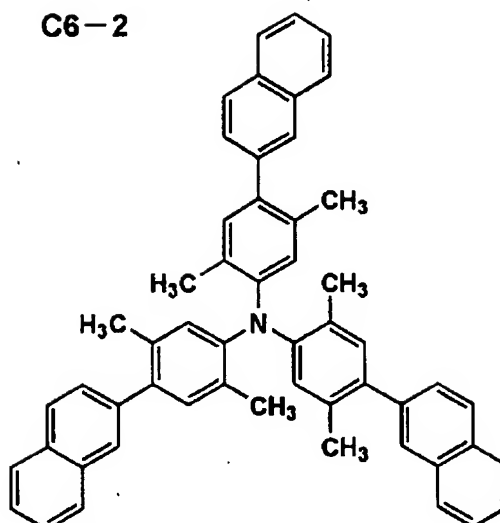


[Chemical formula 390]

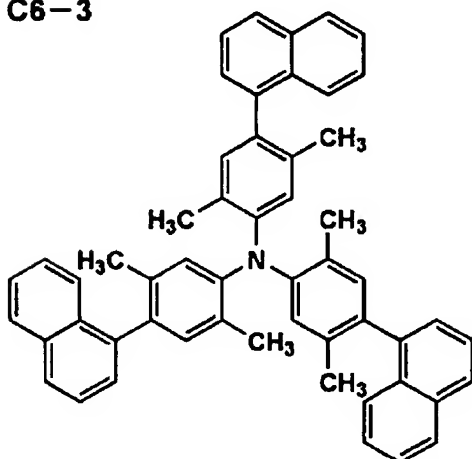
C6-1



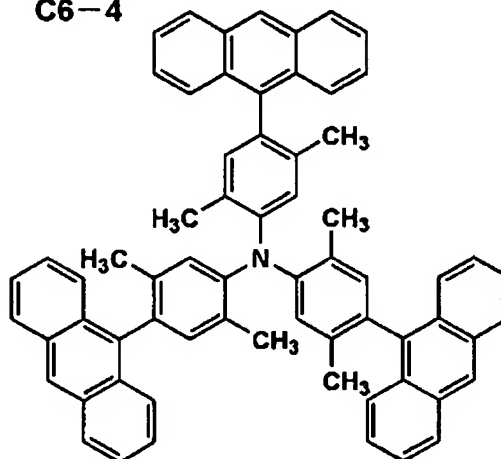
C6-2



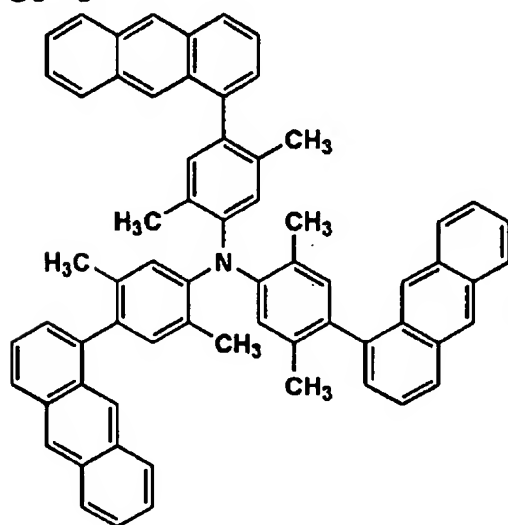
C6-3



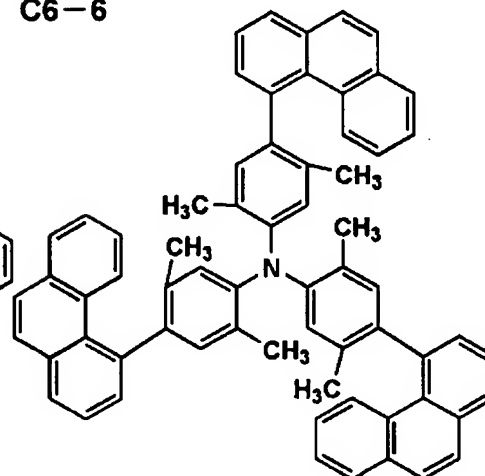
C6-4



C6-5



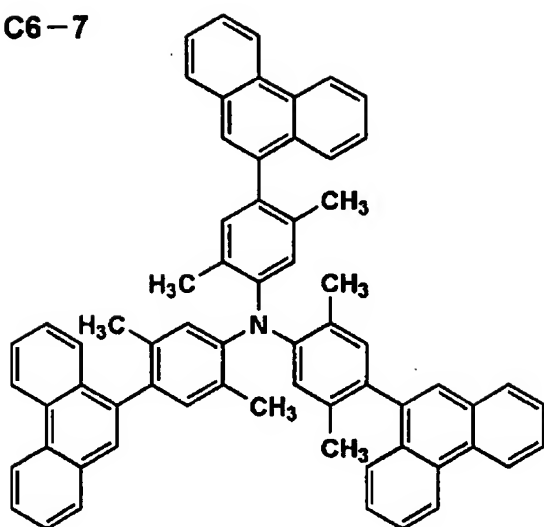
C6-6



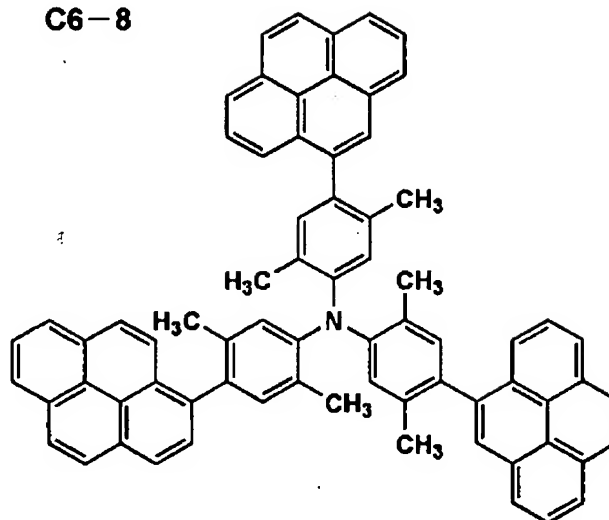
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[Chemical formula 391]

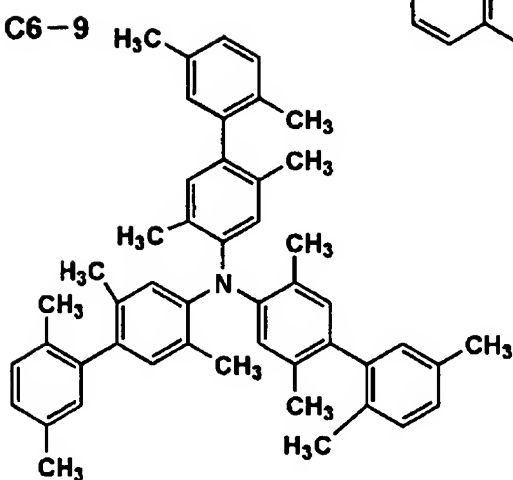
C6-7



C6-8



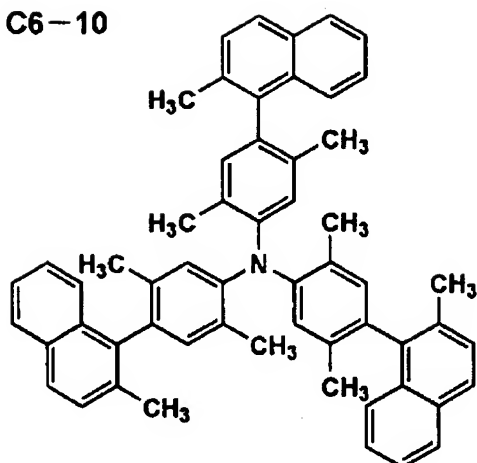
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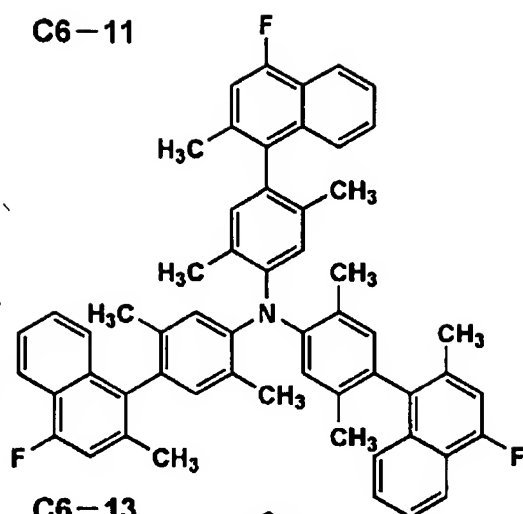
[0616]

[Chemical formula 392]

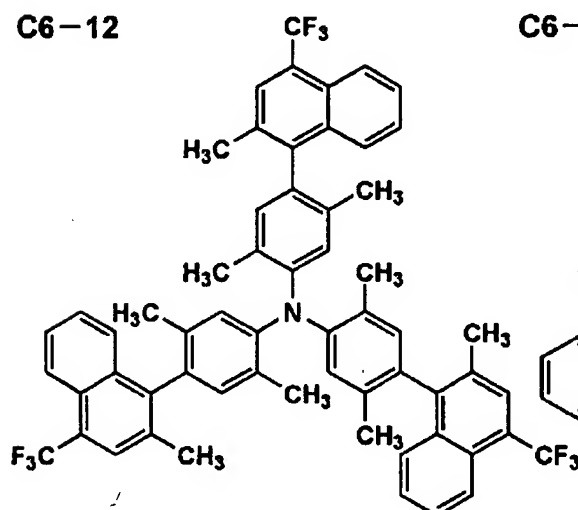
C6-10



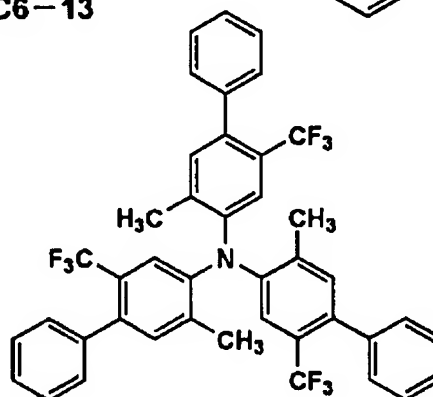
C6-11



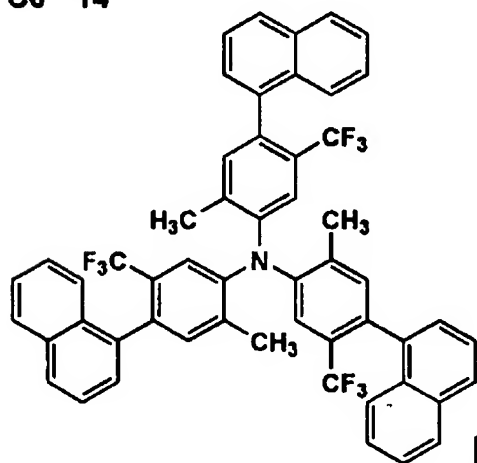
C6-12



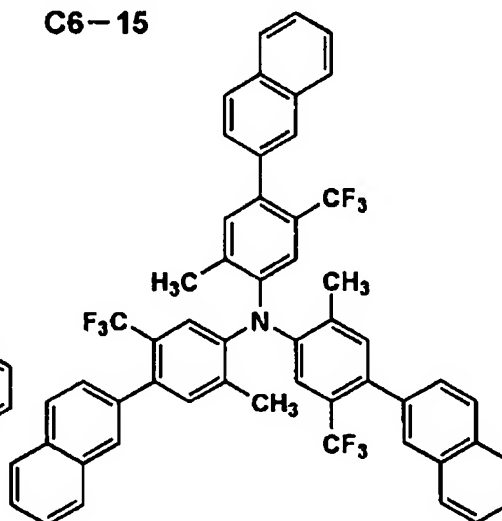
C6-13



C6-14



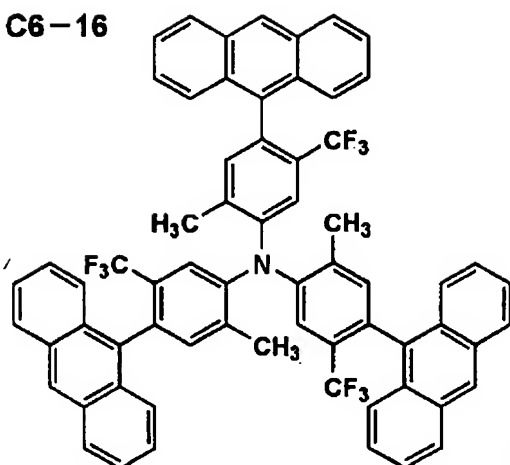
C6-15



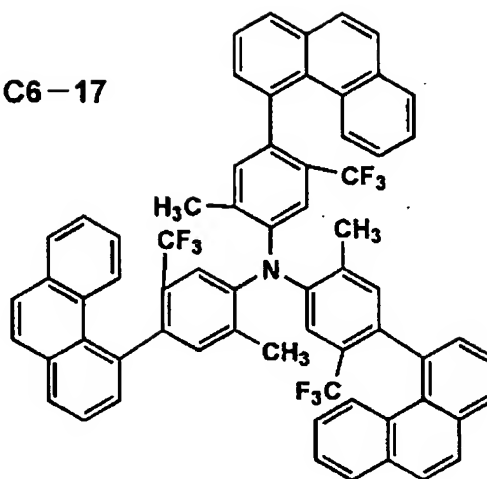
[0617]

[Chemical formula 393]

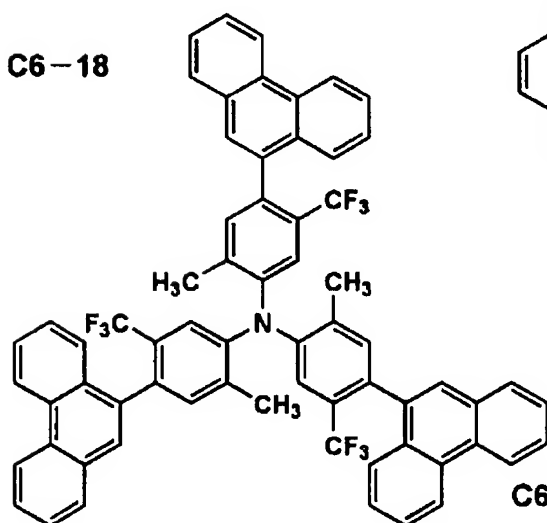
C6-16



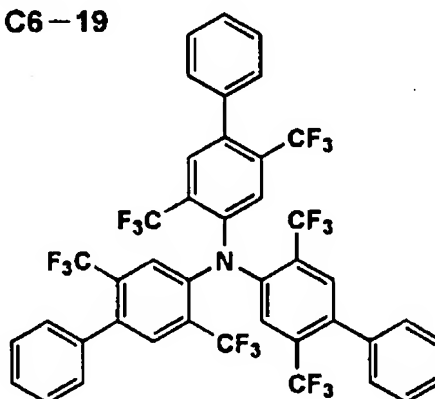
C6-17



C6-18



C6-19

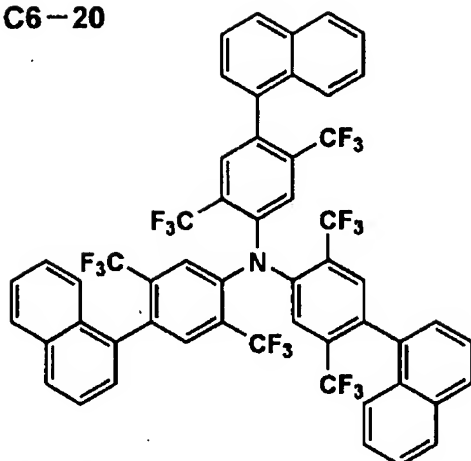


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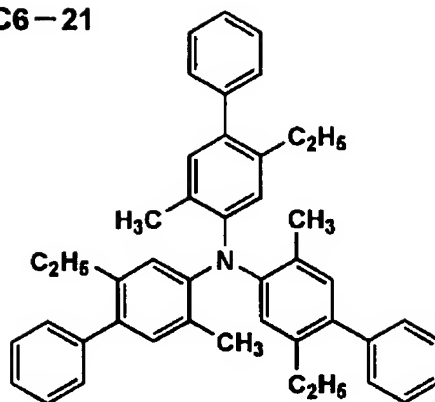
[Chemical formula 394]



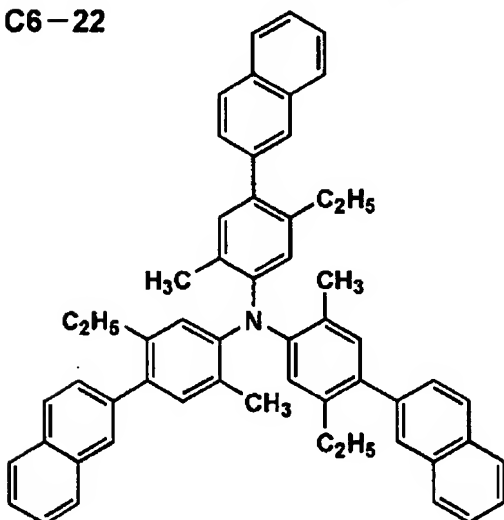
C6-20



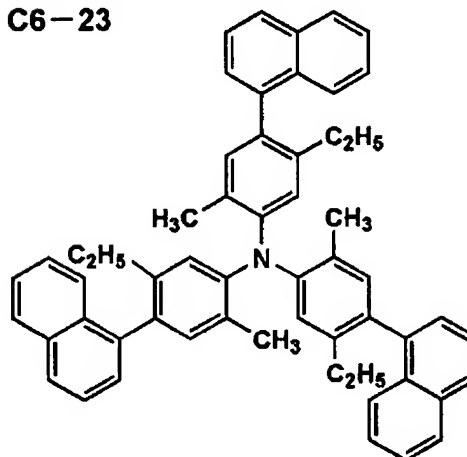
C6-21



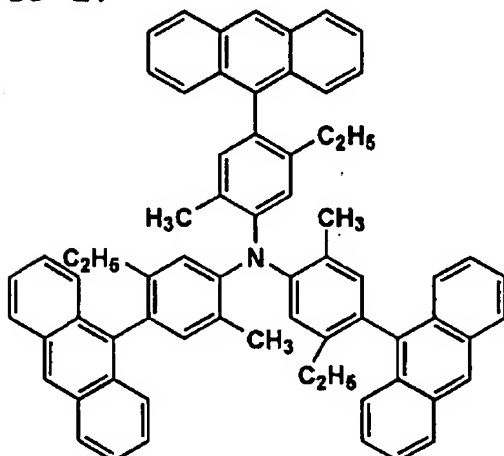
C6-22



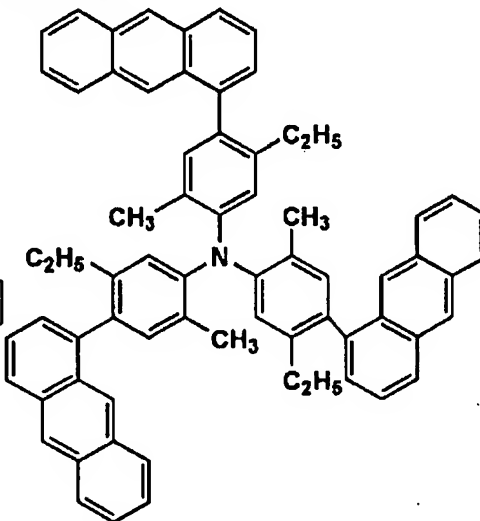
C6-23



C6-24



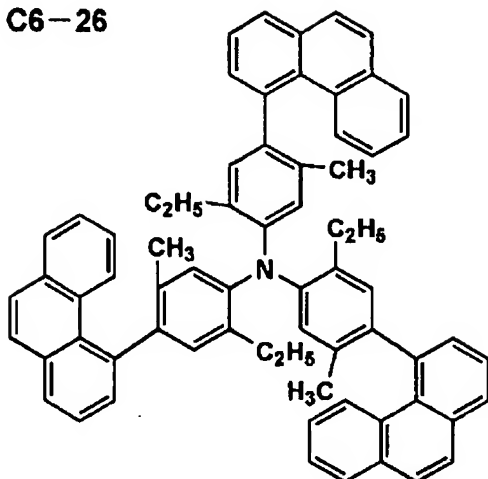
C6-25



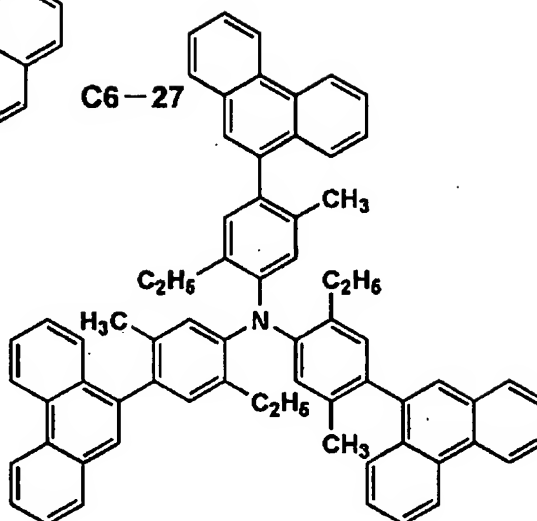
[0619]

[Chemical formula 395]

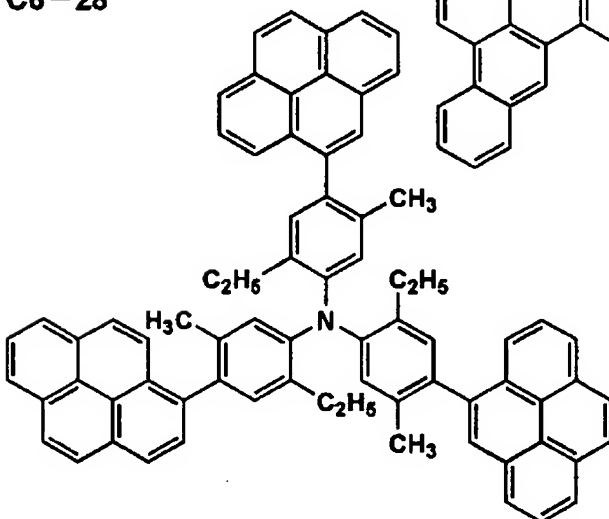
C6-26



C6-27



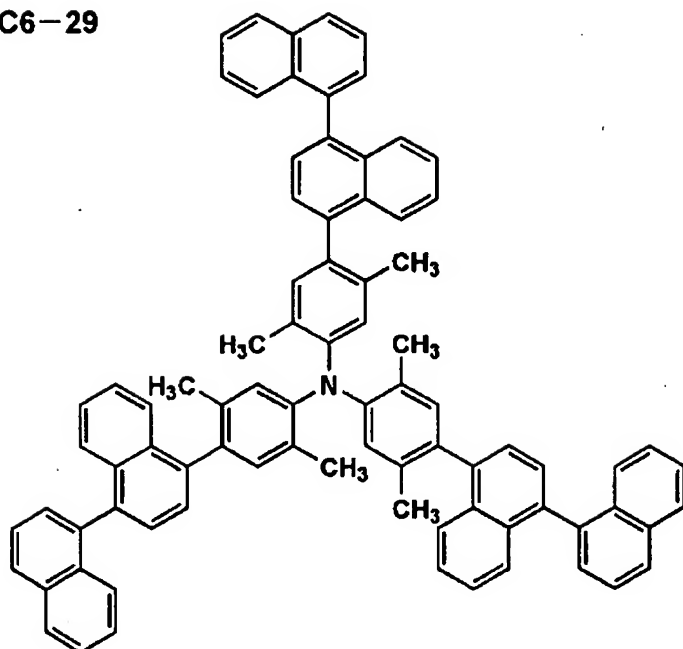
C6-28



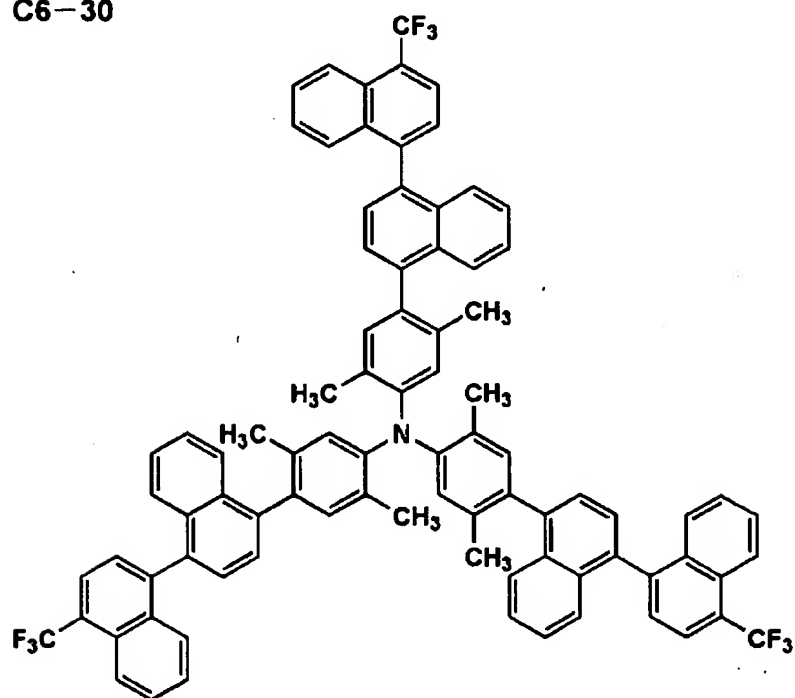
[0620]

[Chemical formula 396]

C6-29

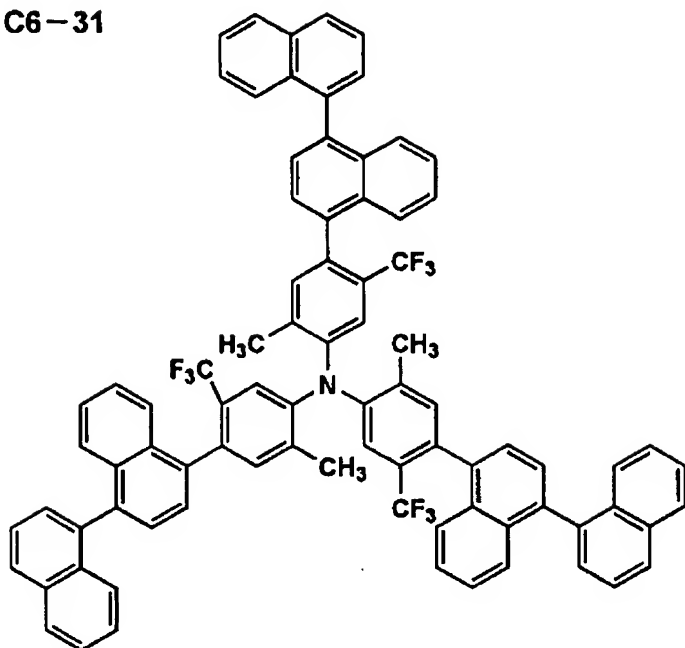
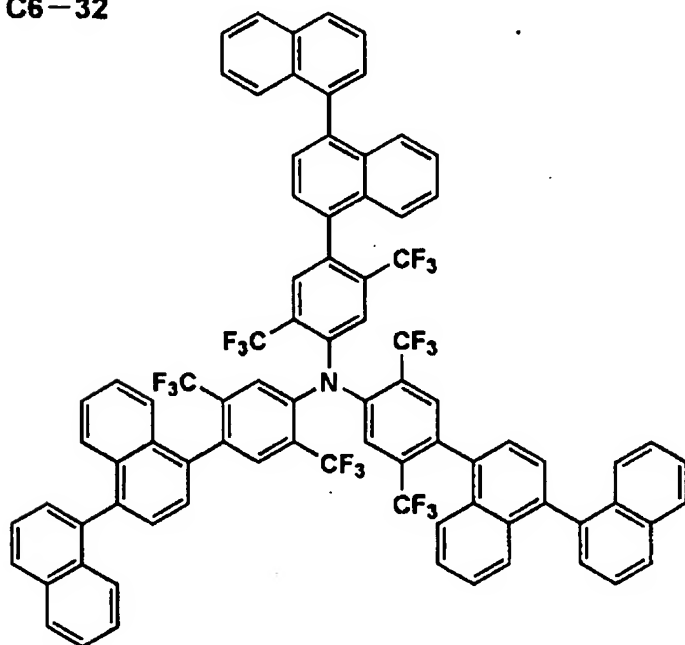


C6-30



[0621]

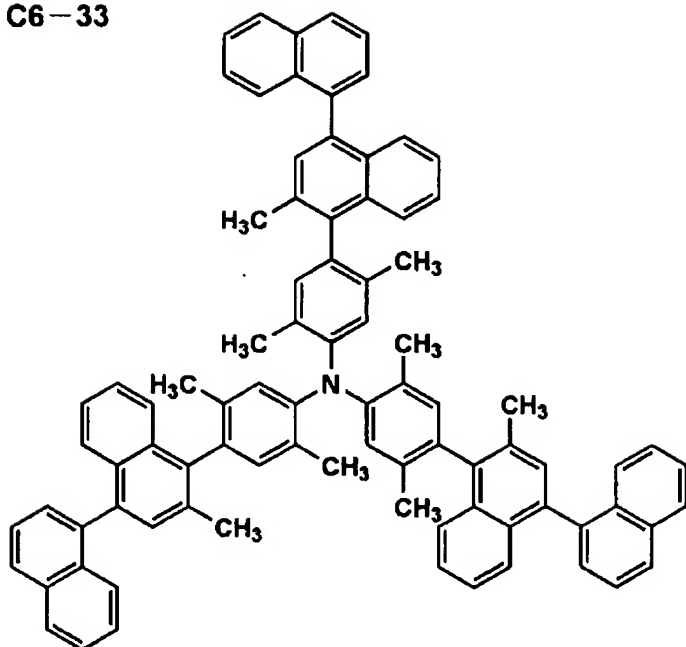
[Chemical formula 397]

**C6-31****C6-32**

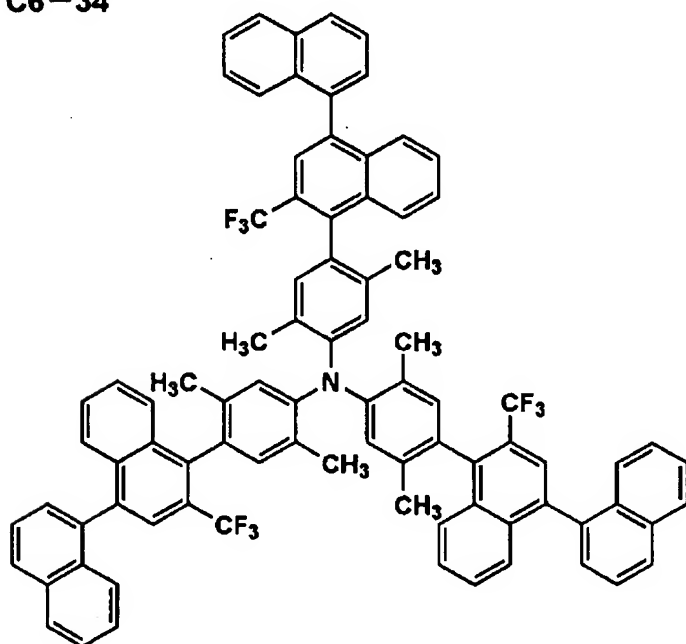
[0622]

[Chemical formula 398]

C6-33



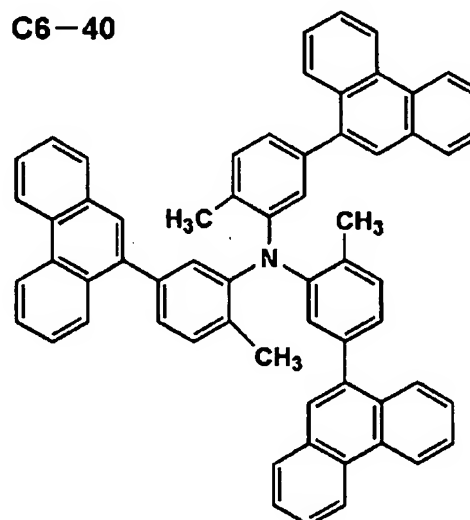
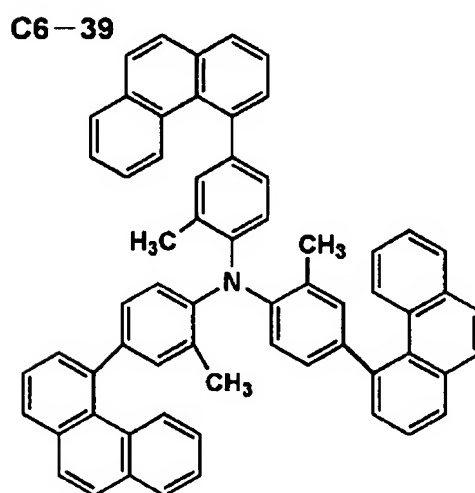
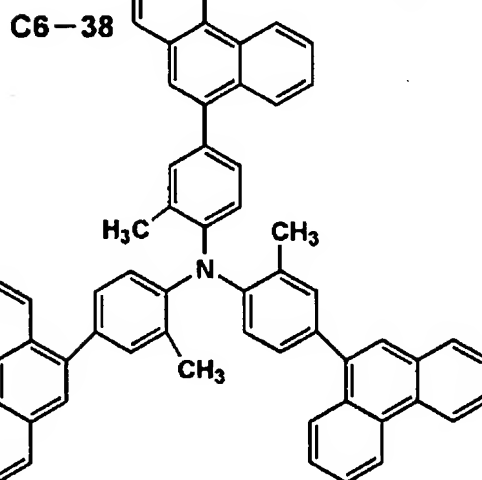
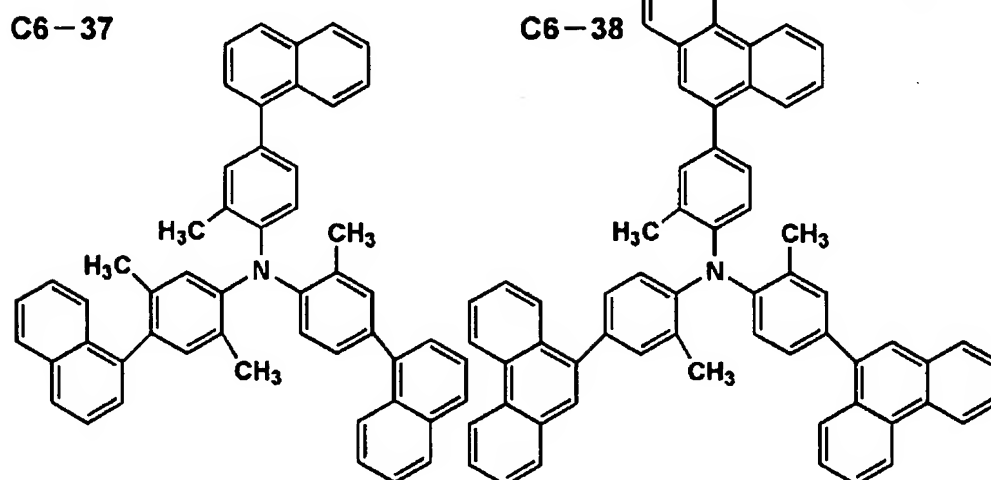
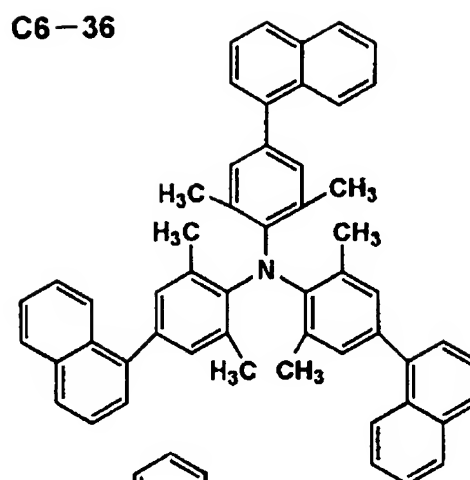
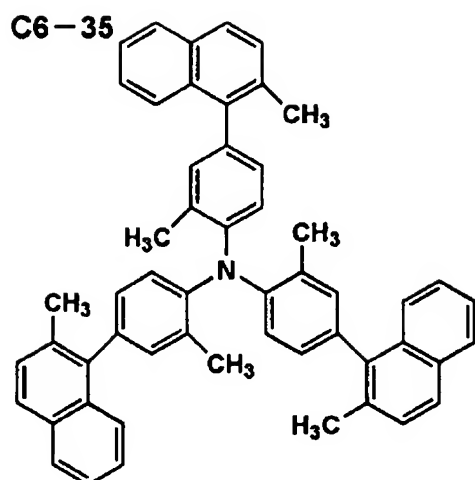
C6-34



[0623]

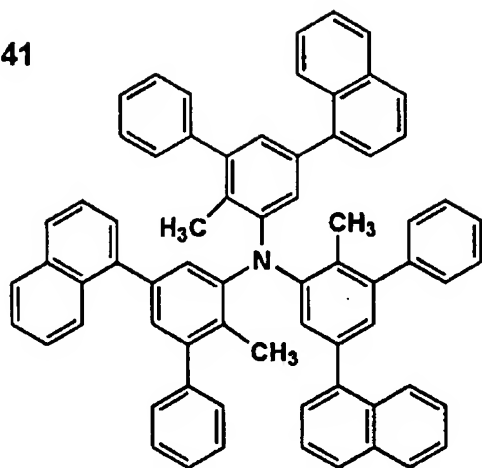
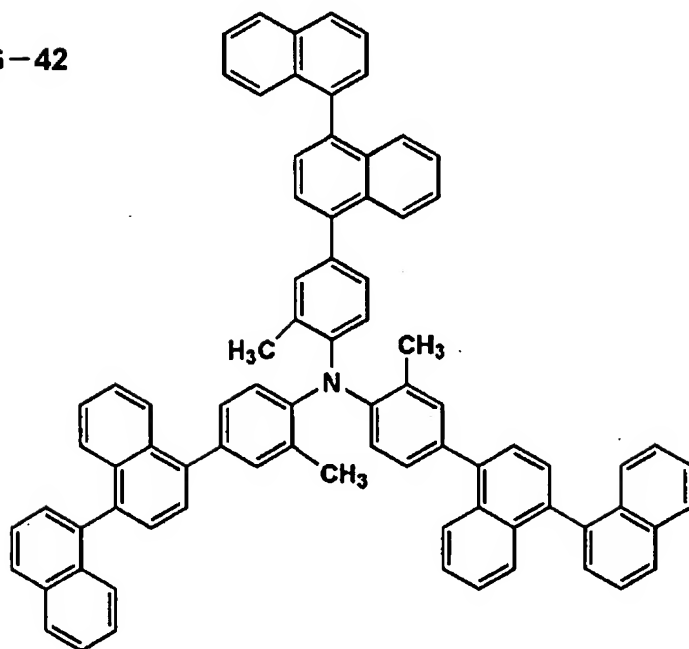
[Chemical formula 399]





[0624]

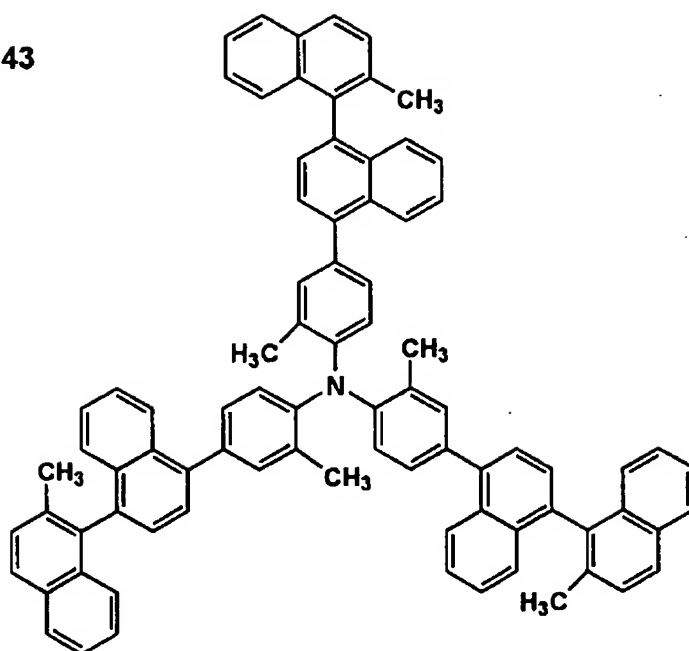
[Chemical formula 400]

**C6-41****C6-42**

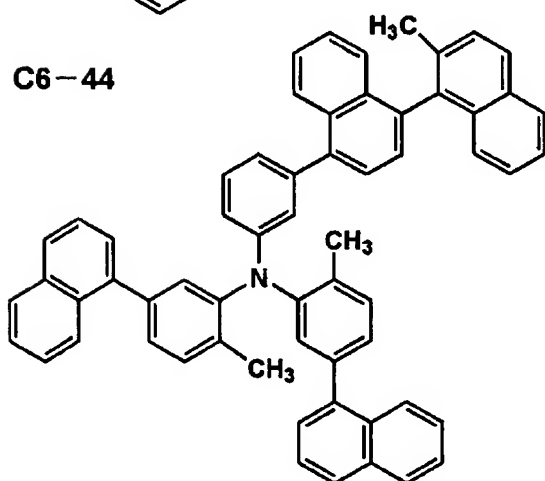
[0625]

[Chemical formula 401]

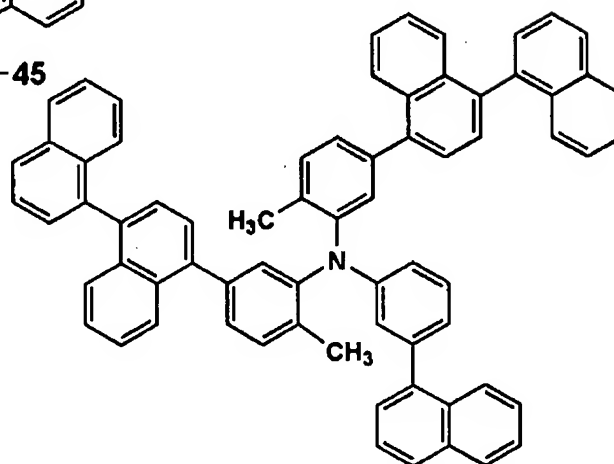
C6-43



C6-44



C6-45

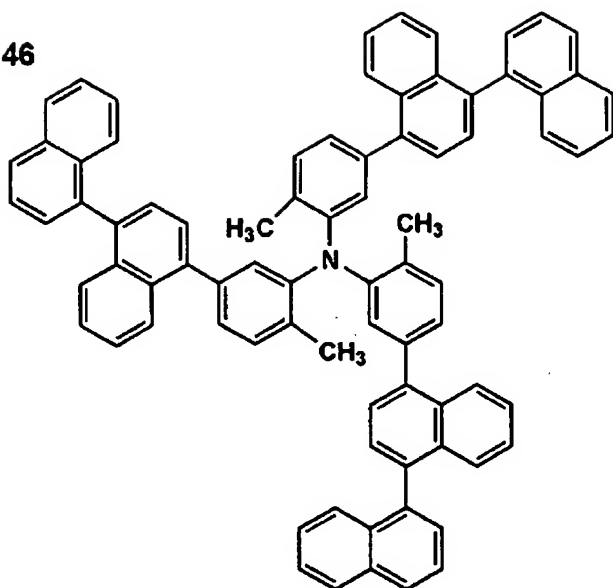


[0626]

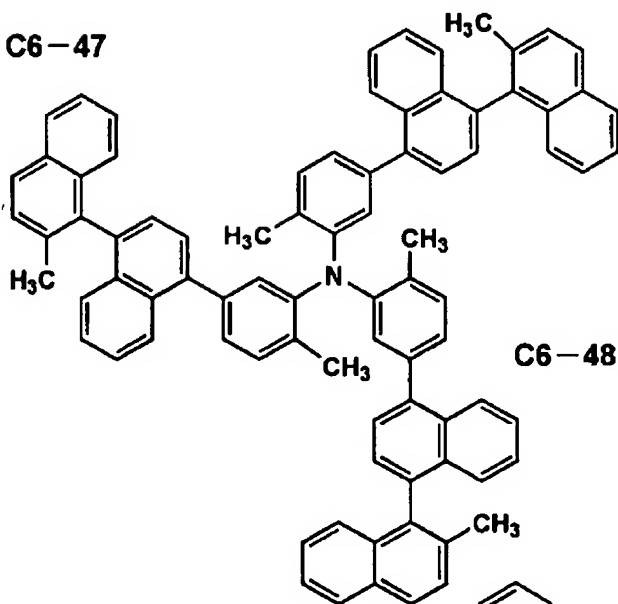
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[Chemical formula 402]

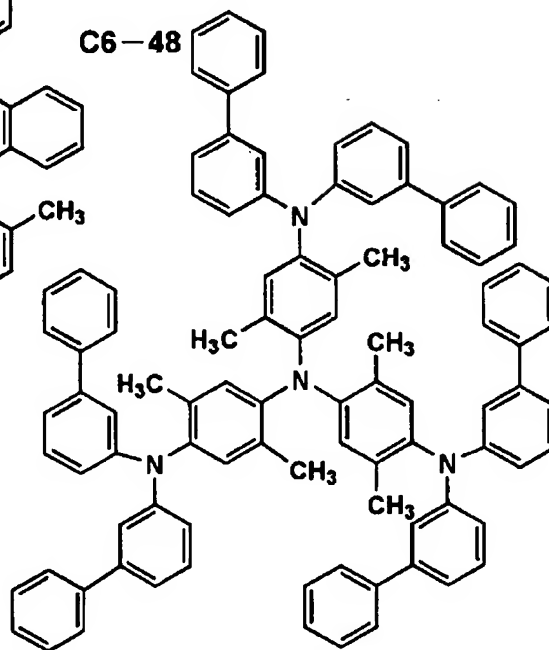
C6-46



C6-47

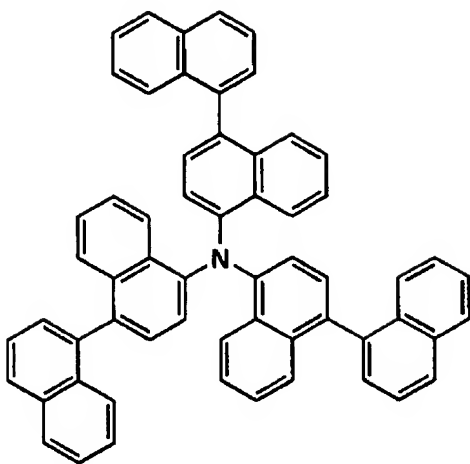
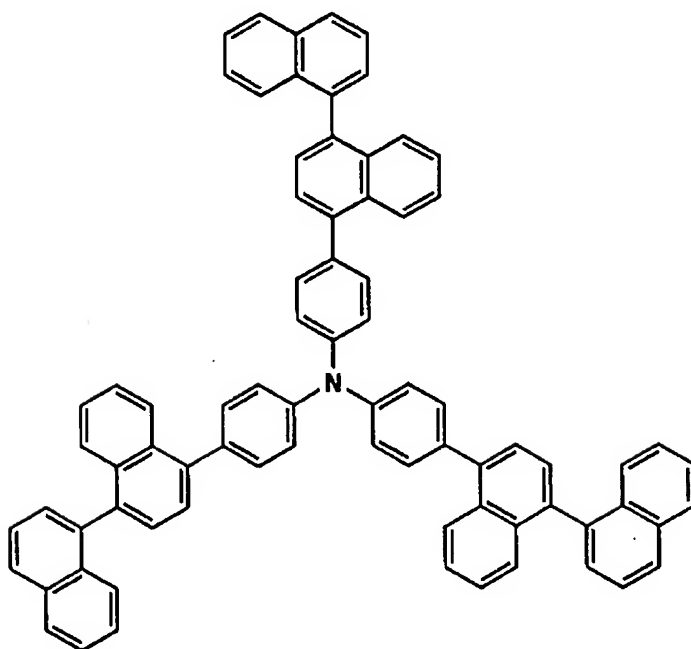


C6-48



[0627]

[Chemical formula 403]

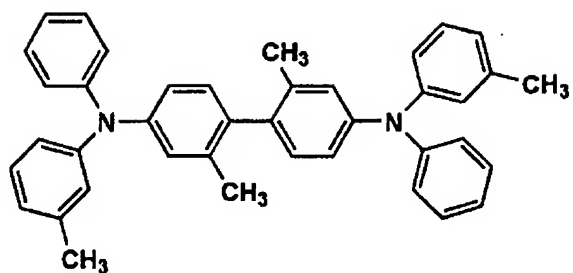
**C6-49****C6-50**

[0628]

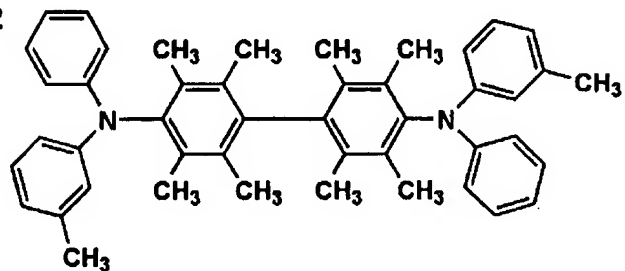
[Chemical formula 404]



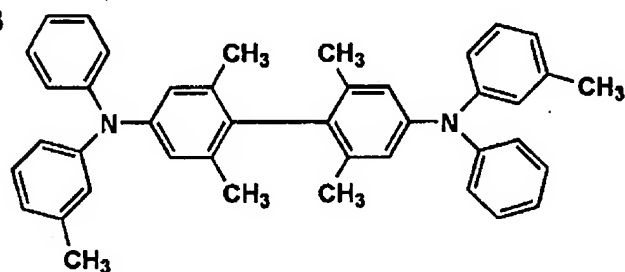
C6-NT-1



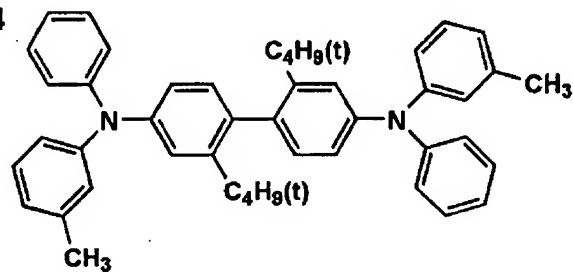
C6-NT-2



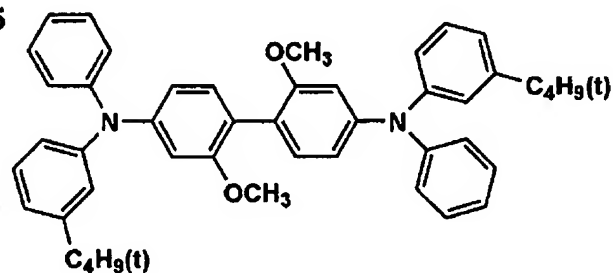
C6-NT-3



C6-NT-4



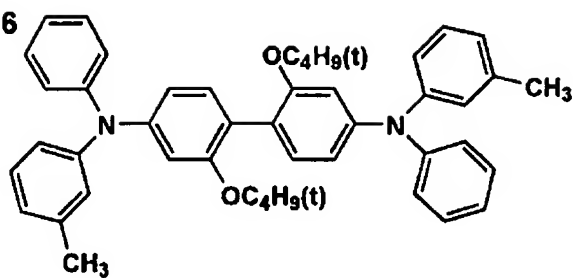
C6-NT-5



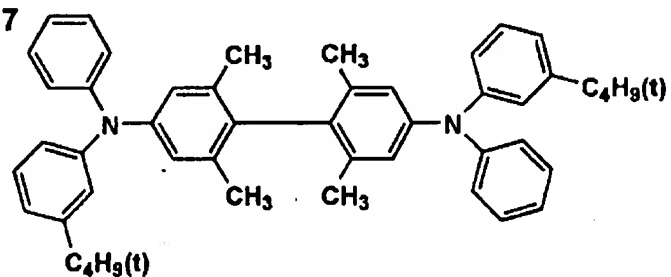
[0629]

[Chemical formula 405]

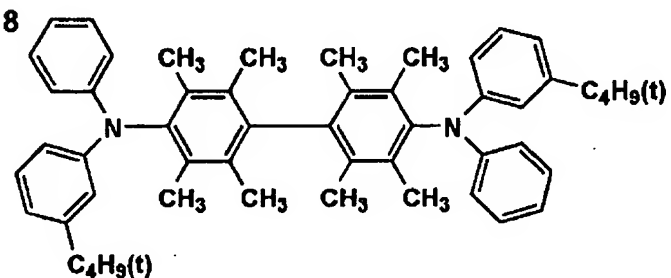
C6-NT-6



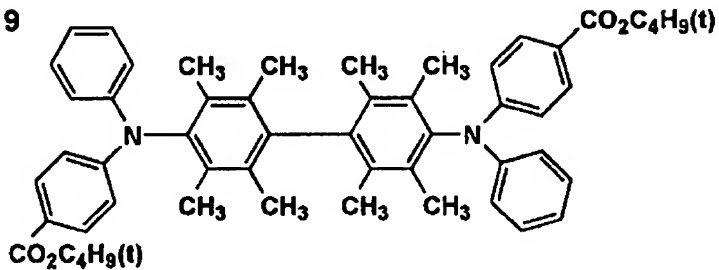
C6-NT-7



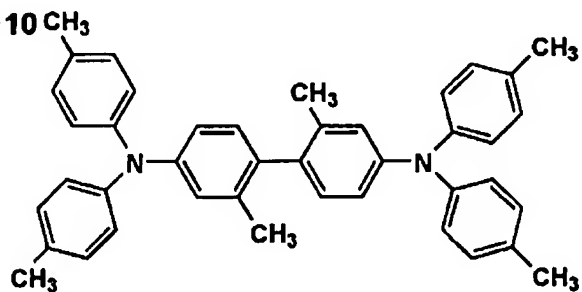
C6-NT-8



C6-NT-9

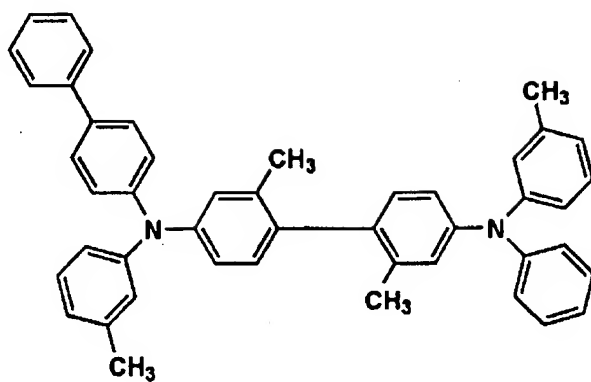
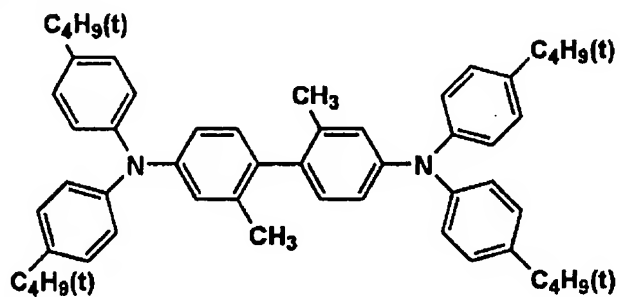
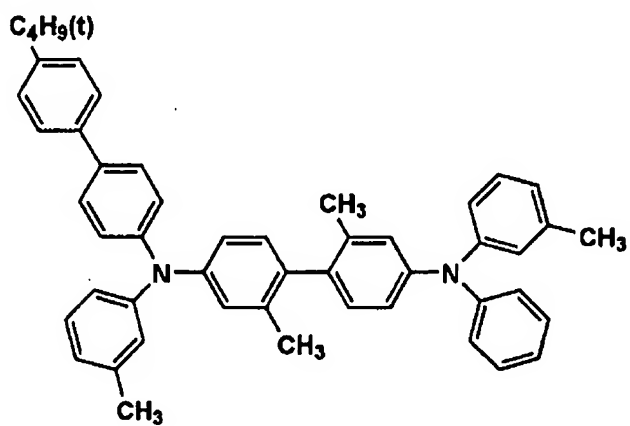


C6-NT-10



[0630]

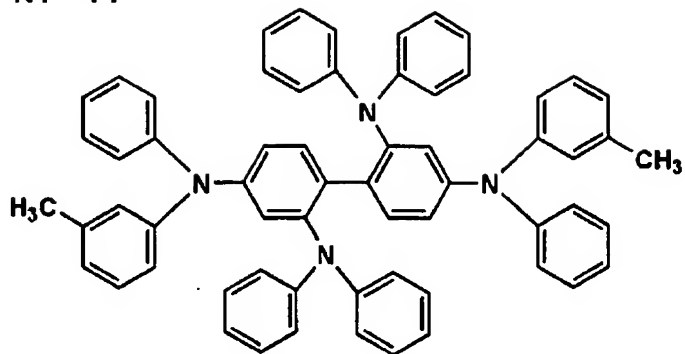
[Chemical formula 406]

**C6-NT-11****C6-NT-12****C6-NT-13**

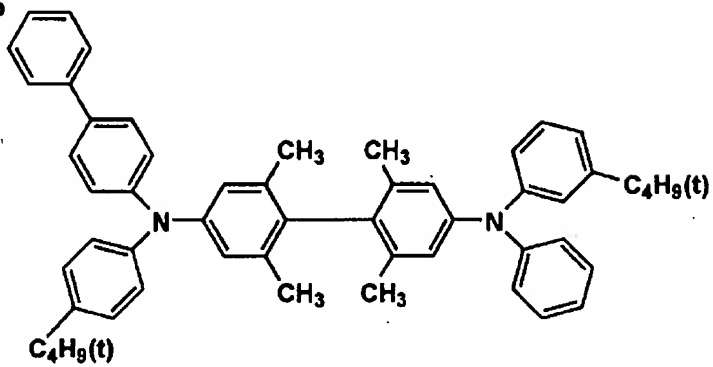
[0631]

[Chemical formula 407]

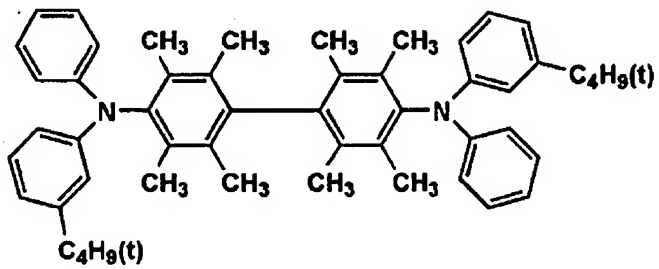
**C6-NT-14**



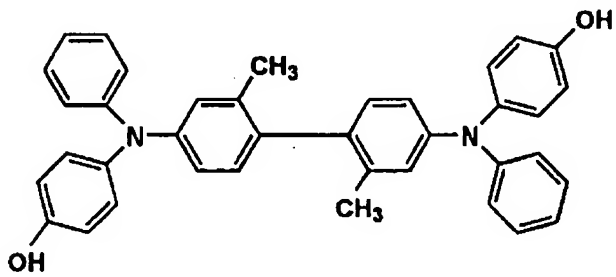
**C6-NT-15**



**C6-NT-16**

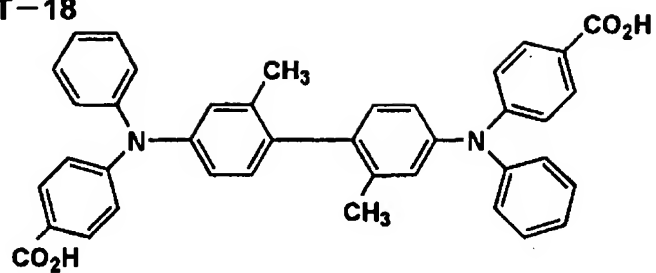
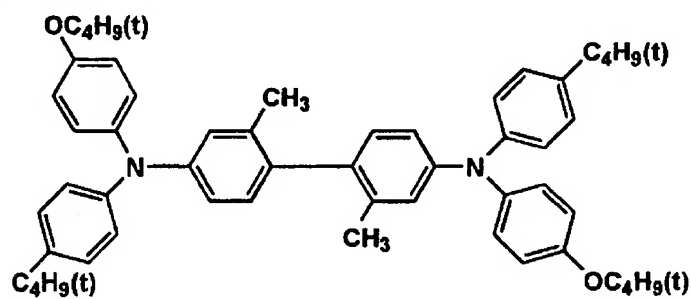
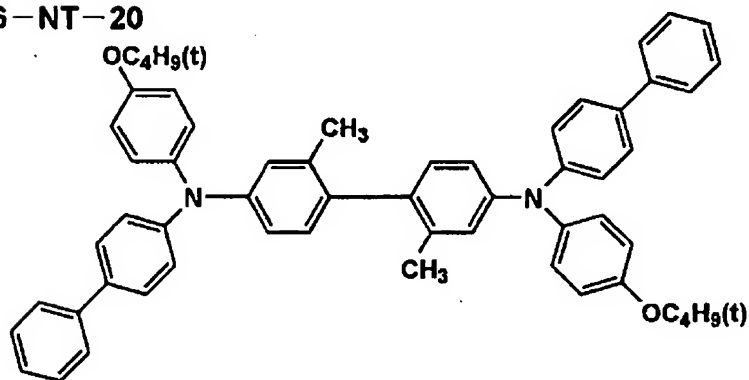


**C6-NT-17**



[0632]

[Chemical formula 408]

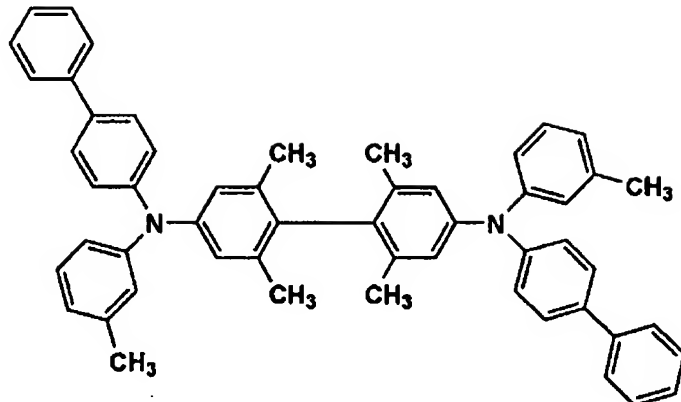
**C6-NT-18****C6-NT-19****C6-NT-20**

[0633]

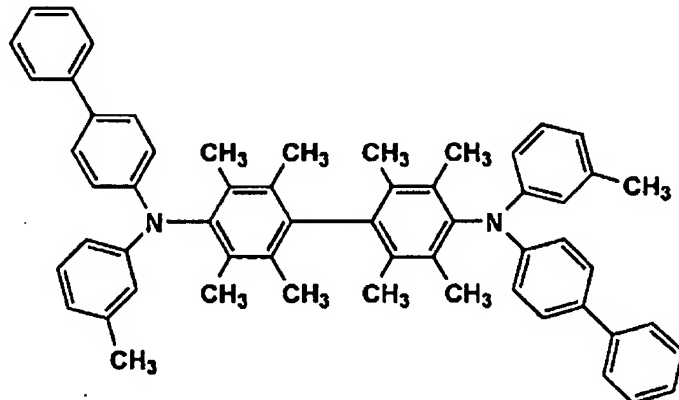
[Chemical formula 409]



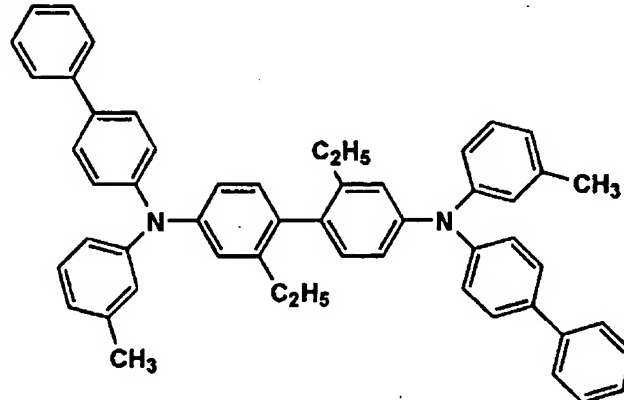
C6-NP-1



C6-NP-2



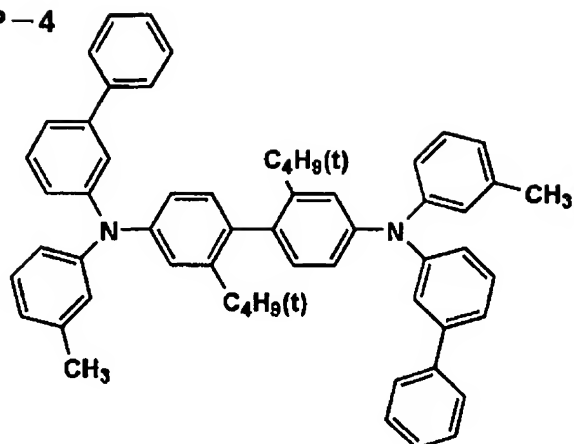
C6-NP-3



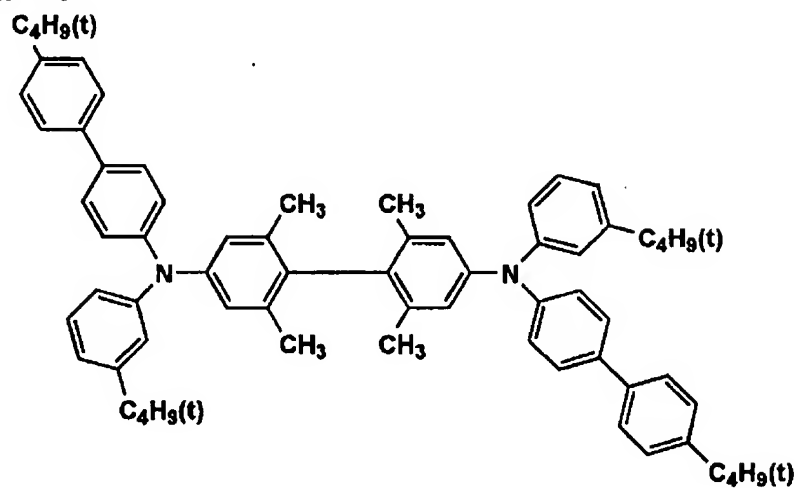
[0634]

[Chemical formula 410]

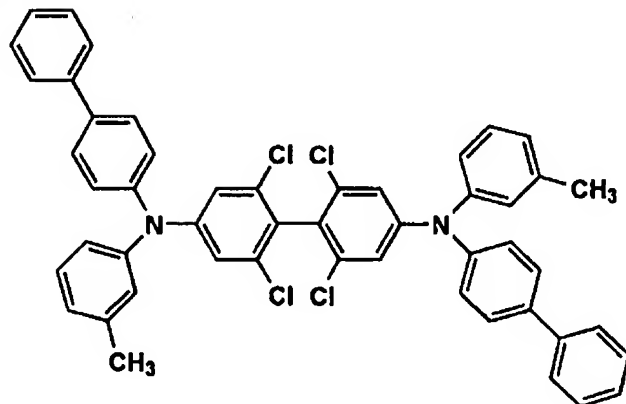
C6-NP-4



C6-NP-5



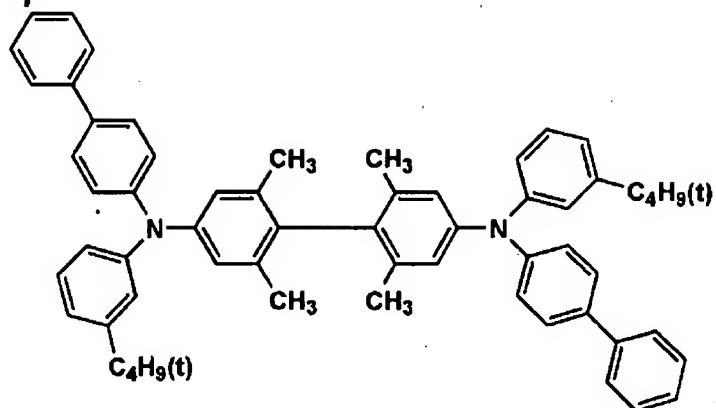
C6-NP-6



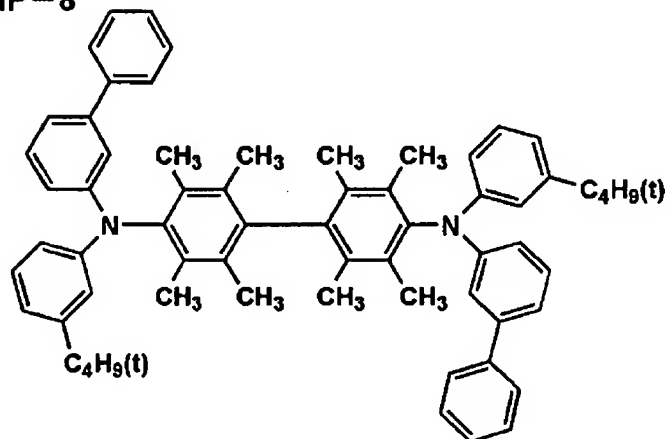
[0635]

[Chemical formula 411]

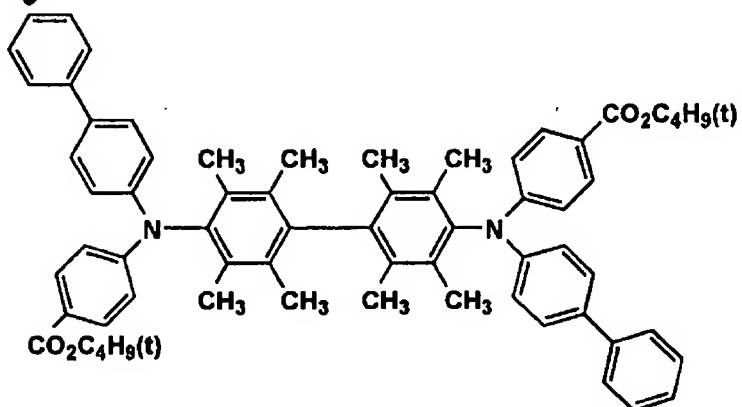
C6-NP-7



C6-NP-8

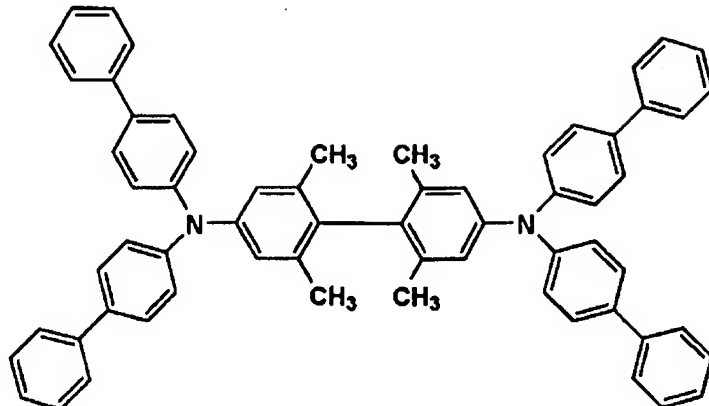
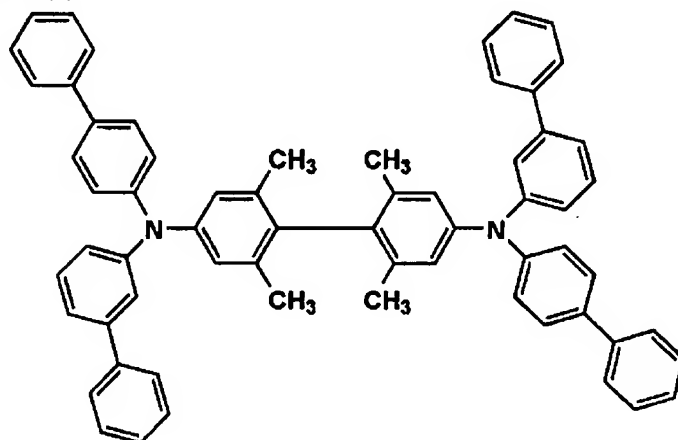
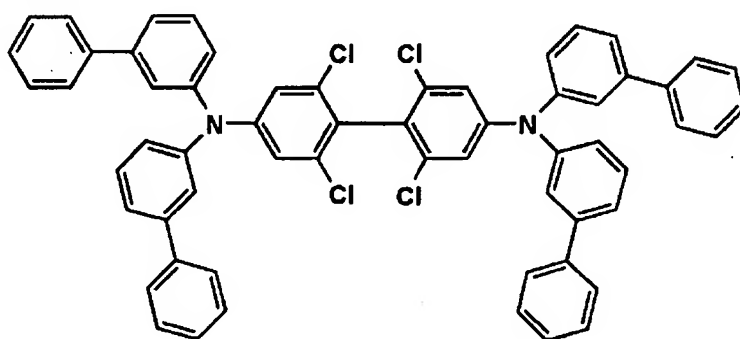


C6-NP-9



[0636]

[Chemical formula 412]

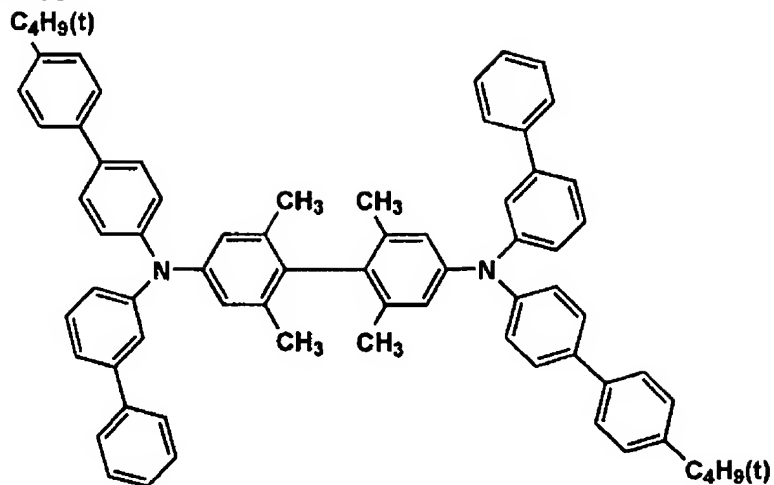
**C6-NP-10****C6-NP-11****C6-NP-12**

[0637]

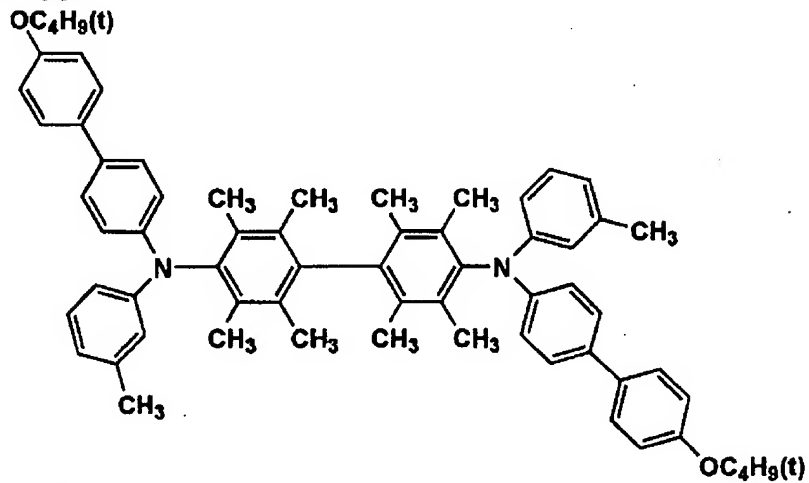
[Chemical formula 413]



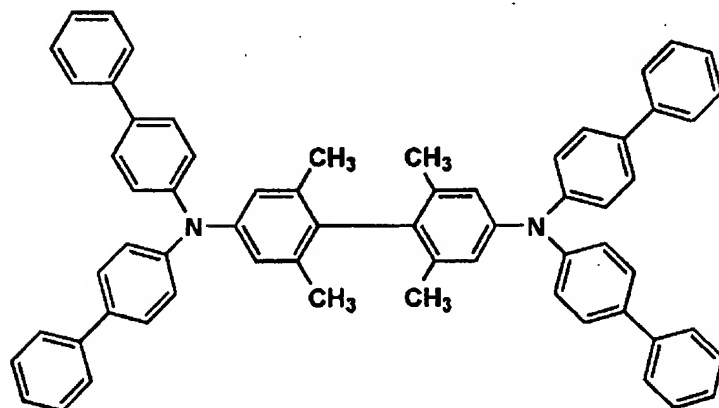
C6-NP-13



C6-NP-14

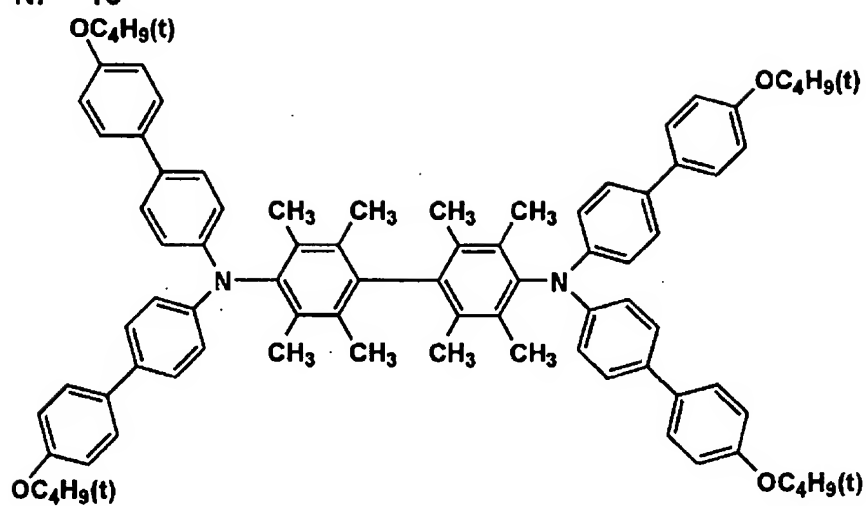


C6-NP-15



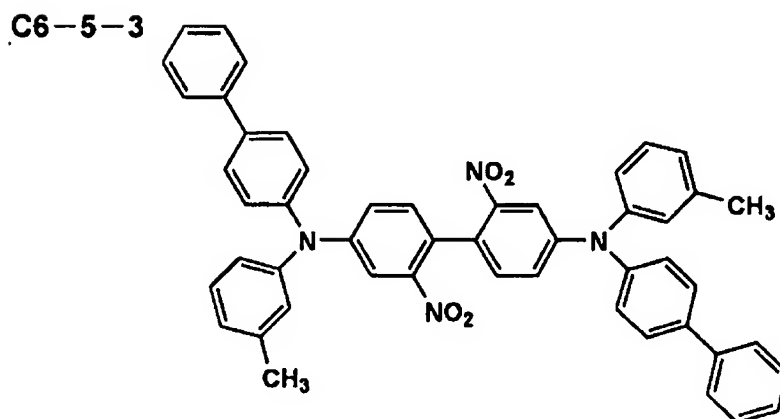
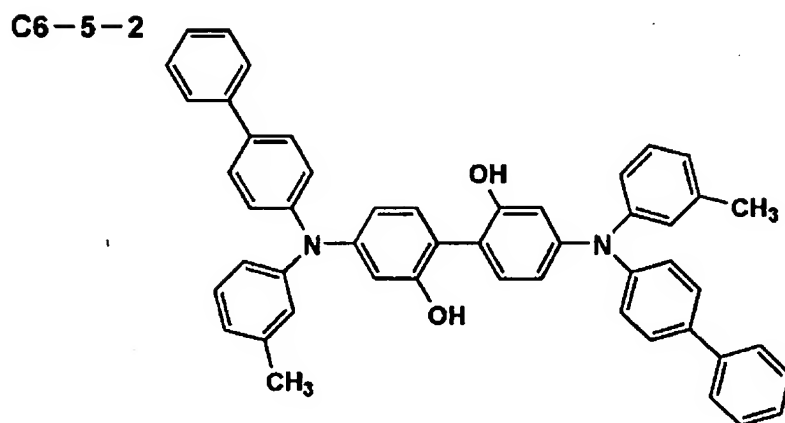
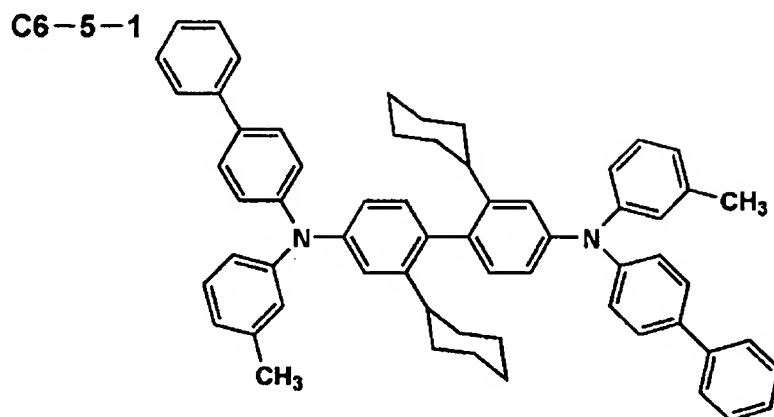
[0638]

[Chemical formula 414]

**C6-NP-16**

[0639]

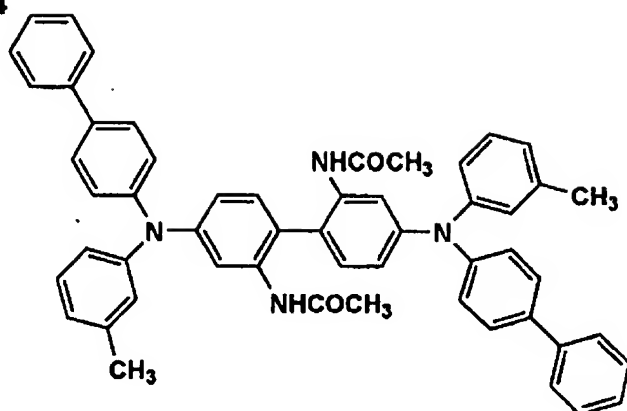
[Chemical formula 415]



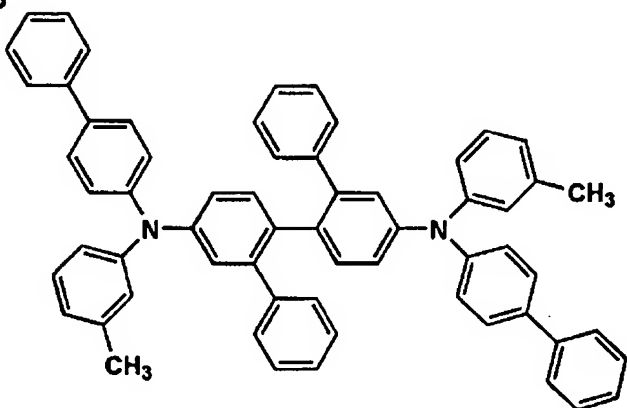
[0640]

[Chemical formula 416]

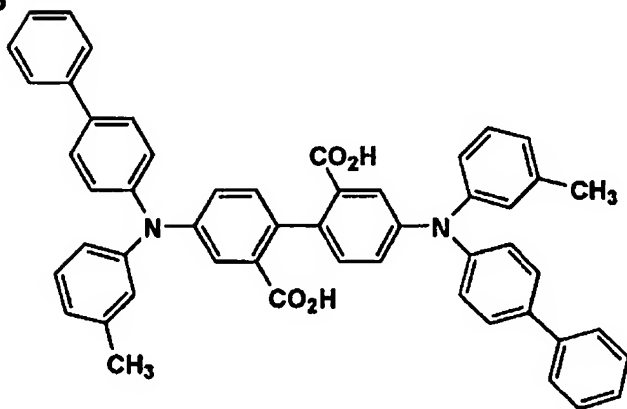
C6-5-4



C6-5-5



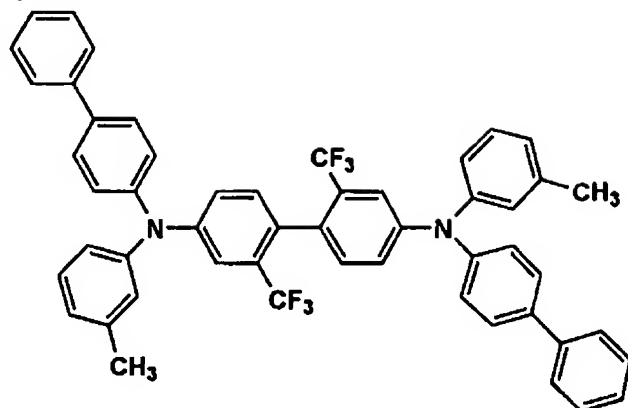
C6-5-6



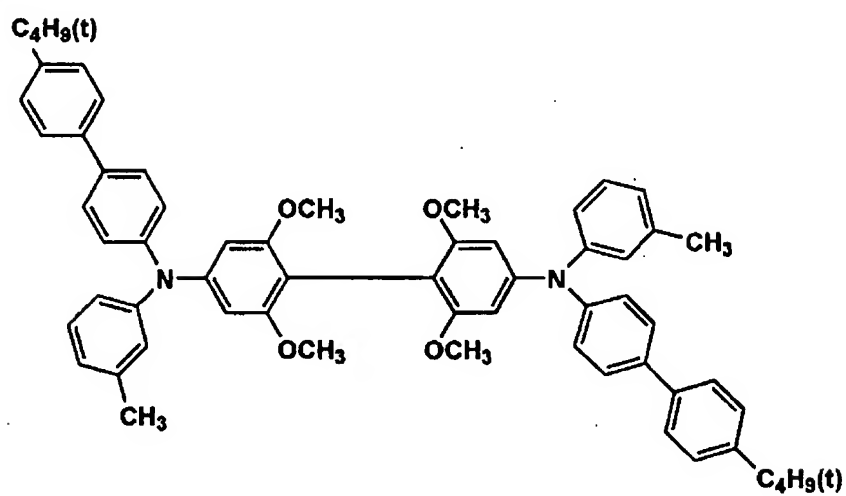
[0641]

[Chemical formula 417]

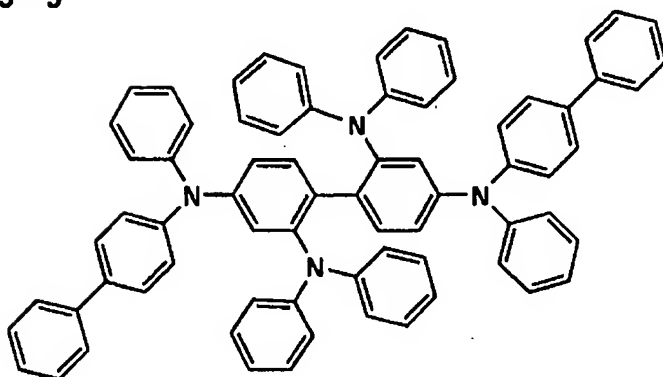
C6-5-7



C6-5-8



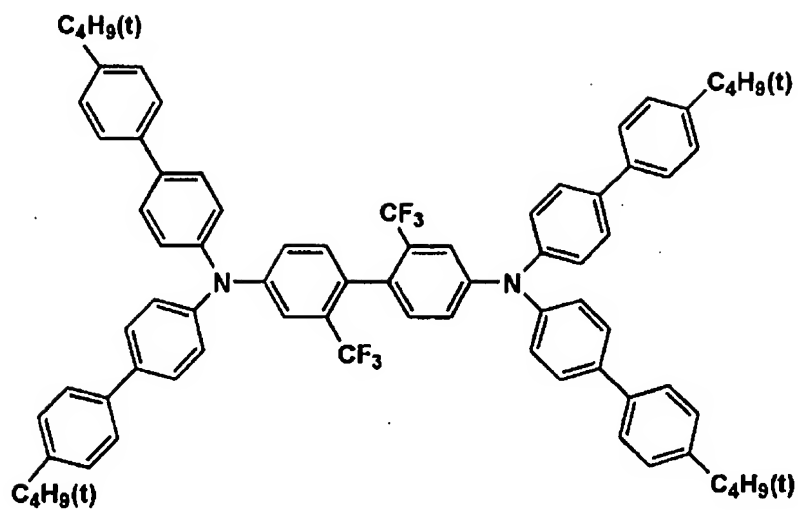
C6-5-9



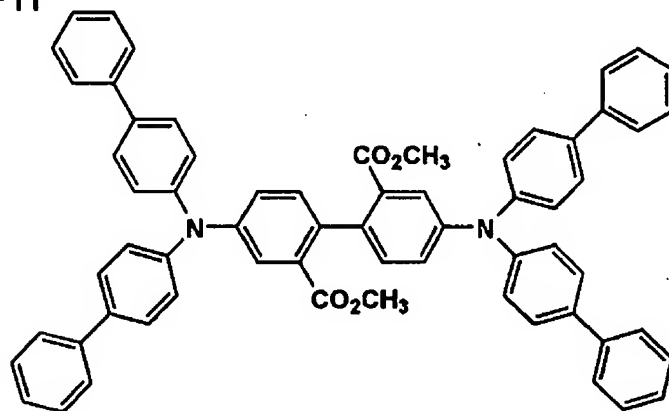
[0642]

[Chemical formula 418]

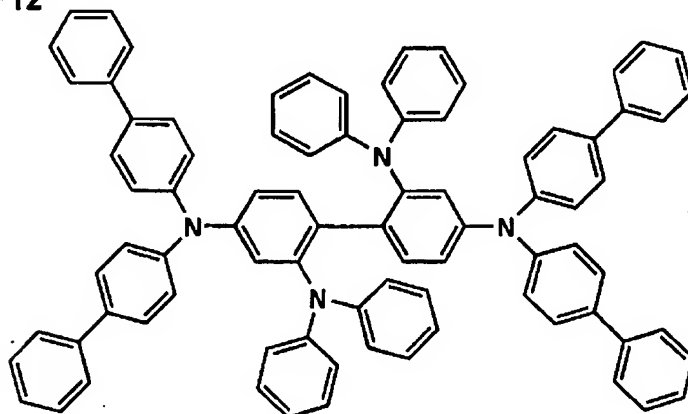
C6-5-10



C6-5-11



C6-5-12

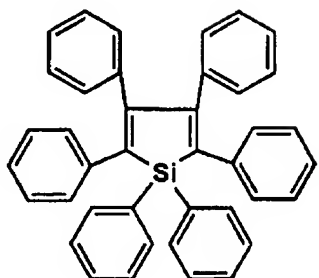




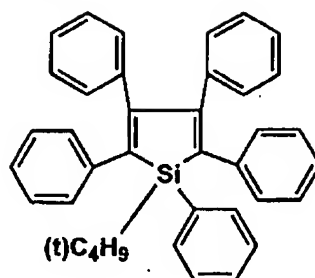
[0643]

[Chemical formula 419]

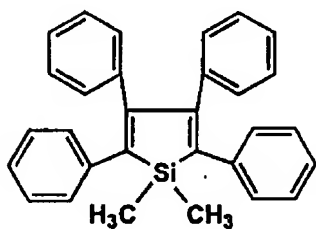
C6-2-1



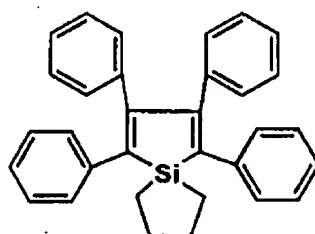
C6-2-2



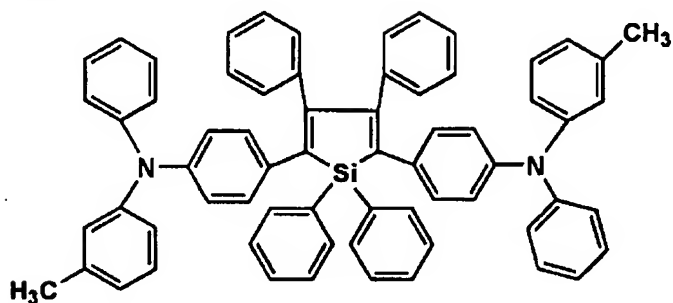
C6-2-3



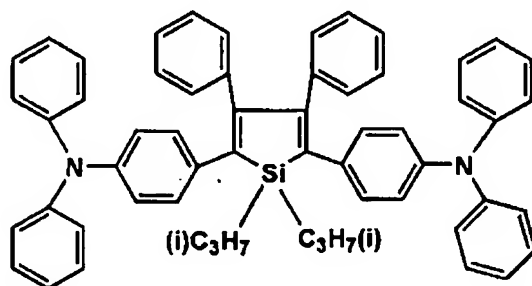
C6-2-4



C6-2-5



C6-2-6

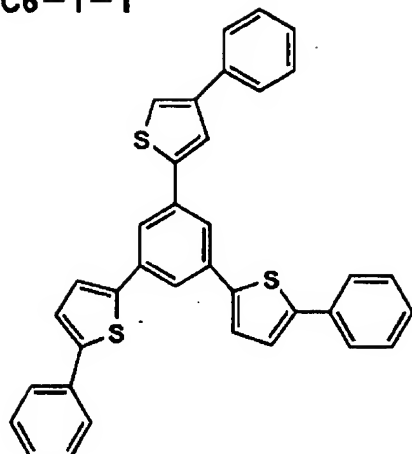


[0644]The following compounds other than the compound by which the ratio (N/C) of the number of nitrogen atoms in the molecule which can be used for this invention to the number of carbon atoms is expressed with said general formula (C6-I) - (C6-V) as or more 0 a fluorogenic compound which is 0.05 or less are raised.

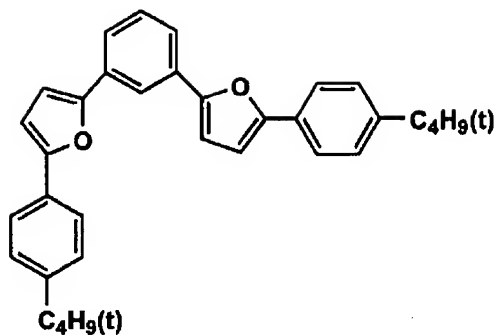
[0645]

[Chemical formula 420]

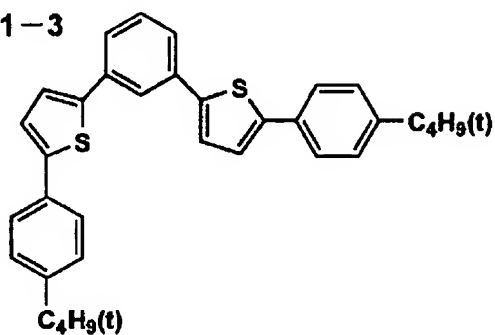
C6-1-1



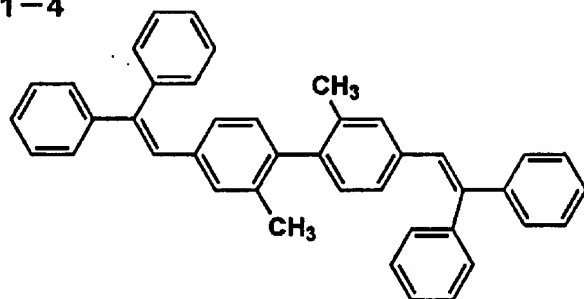
C6-1-2



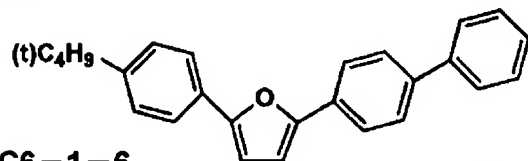
C6-1-3



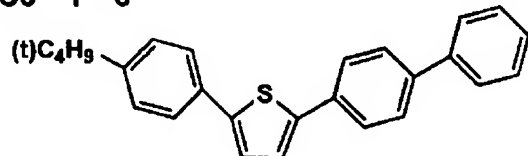
C6-1-4



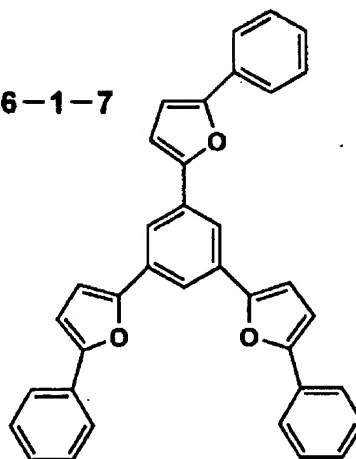
C6-1-5



C6-1-6



C6-1-7



[0646]The compound denoted by general formula (C7-1) - (C7-3) is explained.  $Z_1, Z_2, Z_3, Z_4, Z_5$ , and  $Z_6$  express an atomic group required to form a ring respectively among a formula, .  
 $[Z_6Z_4Z_2\text{either one of } Z_1 \text{ or } Z_3 \text{ or } Z_5, \text{ or}]$  It is a disconjugation ring of 7 - 9 member which is not replaced [ substitution or ] at least, or  $Z_1, Z_2$ , and  $Z_5$  are eight conjugate membered-rings which have two or more hetero atoms among these. When it has a substituent in  $Z_1, Z_2, Z_3, Z_4, Z_5$ , and  $Z_6$ , sigmap of the substituent is less than more than -0.90 0.50. The heterocycle which the hydrocarbon ring which is not limited as an atomic group required to form the ring denoted by  $Z_1, Z_2, Z_3, Z_4, Z_5$ , and  $Z_6$  especially if it is a ring more than 3 member, and comprised only a carbon atom and a hydrogen atom may be sufficient as, and contains the hetero atom may be sufficient. It is a ring of 5 - 12 member preferably. Although the heterocycle which the hydrocarbon ring which comprised only a carbon atom and a hydrogen atom may be sufficient as the disconjugation ring of 7 - 9 member, and contains the hetero atom may be sufficient, when it is eight conjugate membered-rings, two or more hetero atoms are certainly contained. These may have two or more arbitrary substituents independently, respectively.

[0647]In general formula (C7-1) - (C7-3),  $Z_1, Z_2$ , Both  $Z_3, Z_4, Z_5$ , and  $Z_6$  may be the disconjugation rings of 7 - 9 member which are not replaced [ substitution or ], or  $Z_1, Z_2$ , and  $Z_5$  may be the cases where they are eight conjugate membered-rings which have two or more hetero atoms, among these.

[0648]A monocycle or a condensed ring may be sufficient as  $Z_1$  in general formula (C7-1) - (C7-3),  $Z_2, Z_3, Z_4, Z_5$ , and  $Z_6$ . In the case of a condensed ring, it is a case where two or more substituents condense mutually and form the ring further, but it is preferred that it is a monocycle.  $n_1$  and  $n_2$  are one or more integers, and  $n_3$  is an integer greater than or equal to 0.  $n_1$  and  $n_2$  have a preferred case of 1, and  $n_3$  has a preferred case of 0.

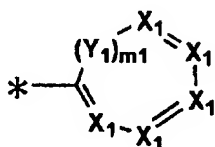
[0649]It is preferred that  $Z_1 - Z_6$  of said general formula (C7-1) - (C7-3) are denoted by

following general formula (C7-5) - (C7-10).

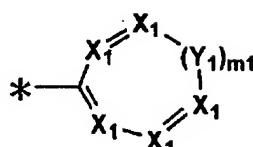
[0650]

[Chemical formula 421]

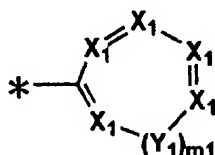
一般式(C7-5)



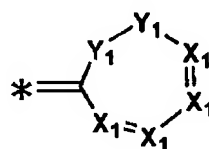
一般式(C7-6)



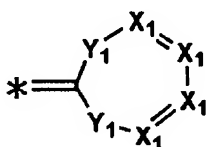
一般式(C7-7)



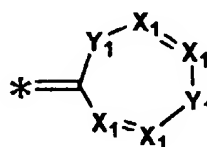
一般式(C7-8)



一般式(C7-9)



一般式(C7-10)



[0651]-CRd= or -N=, and Y<sub>1</sub> of X<sub>1</sub> are -NRe-, -C(Rf)<sub>2</sub>-, -O-, or -S- among a formula. However, in the substituent not more than more than -0.90 0.50, Re, and Rf, sigmap of Rd is a hydrogen atom or a substituent, m1 is an integer of 1-3, and \* is a binding site.

[0652]sigmap of said general formula (C7-5), said general formula (C7-5) whose sigmap of Rd - (C7-10) is a substituent not more than more than -0.90 0.30, and Rd - (C7-10) is a substituent

not more than more than -0.90 0.00.

[0653]In said general formula (C7-5) - (C7-10), it is  $m_1=1$ .

[0654]It is preferred that any one or  $Z_5$  is denoted by the following general formula (C7-11) among  $Z_1$  in said general formula (C7-1) or (C7-3) and  $Z_2$ .

[0655]

[Chemical formula 422]

一般式(C7-11)



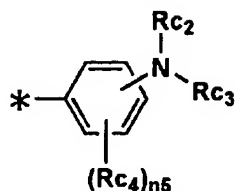
[0656] $Rc_1$  is a hydrogen atom or a substituent among a formula, and  $n_4$  is an integer of 1-5.

[0657]As for any one or  $Z_5$ , it is still more preferred among  $Z_1$  in said general formula (C7-1) or (C7-3), and  $Z_2$  to be expressed with the following general formula (C7-12).

[0658]

[Chemical formula 423]

一般式(C7-12)



[0659] Rc<sub>2</sub>, Rc<sub>3</sub>, and Rc<sub>4</sub> are a hydrogen atom or a substituent among a formula, and n<sub>5</sub> is an integer of 1-4.

[0660] In general formula (C7-1) - (C7-3), Ra<sub>1</sub>, Ra<sub>2</sub>, Ra<sub>3</sub>, Ra<sub>4</sub>, Ra<sub>5</sub>, Ra<sub>6</sub>, and Ra<sub>7</sub> express a hydrogen atom or a substituent, respectively. Although Ra<sub>1</sub>, Ra<sub>2</sub>, Ra<sub>3</sub>, Ra<sub>4</sub>, Ra<sub>5</sub>, Ra<sub>6</sub>, and Ra<sub>7</sub> express a hydrogen atom or a substituent, respectively independently, [ \*\* ] [ as a substituent denoted by Ra<sub>1</sub> - Ra<sub>7</sub> ] an alkyl group (for example, a methyl group, an ethyl group, an isopropyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, a perfluoro propyl group, A perfluoro n-butyl group, a perfluoro t-butyl group, t-butyl group, etc., A cycloalkyl machine (for example, a cyclopentyl group, a cyclohexyl group, etc.), aralkyl groups (for example, a benzyl group, 2-FENECHIRU machine, etc.) and an aryl group (for example, a phenyl group.) alkoxy groups (for example, an ethoxy basis.), such as a naphthyl group, p-trill machine, and p-chlorophenyl machine Aryloxy groups (for example, phenoxy group etc.), such as an isopropoxy group and a butoxy machine, an amino group (a dimethylamino group, a diaryl amino group), a hydroxyl group, halogen atoms (a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc.), etc. are mentioned. These bases may be replaced further and, [ as said substituent ] A halogen atom, a trifluoromethyl group, a cyano group, a nitro group, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkylthio group, a dibenzylamino machine, a diaryl amino group, a dialkylamino group, etc. are mentioned.

[0661] Although Ra<sub>1</sub> - Ra<sub>7</sub> have a preferred hydrogen atom, they are an alkyl group and an aryl group preferably as a substituent.

[0662]-CRa= or -N=, and  $Y_1$  of  $X_1$  are -NRb- or -C(Rc)<sub>2</sub>-. However, as for the substituent not more than more than -0.90 0.50, Rb, and Rc, in a hydrogen atom or a substituent, and m, sigmap of the integer of 1-3 and \* is [ Ra ] a binding site.

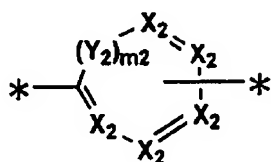
[0663]Rb<sub>1</sub> in Rb, Rc, and a general formula (C7-4), Rb<sub>2</sub>, Rb<sub>3</sub>, Rb<sub>4</sub>, Rb<sub>5</sub>, and Rb<sub>6</sub> are synonymous with Ra<sub>1</sub> in said general formula (C7-1), and Ra<sub>2</sub>.

The disconjugation ring of 7 - 9 member which is not replaced [ the substitution denoted by A in a general formula (C7-4), or ], Or in eight conjugate membered-rings which have two or more hetero atoms, when A has a substituent, sigmap of the substituent is more than -0.90 and 0.50 or less, and is preferably denoted by following general formula (C7-16) - (C7-18).

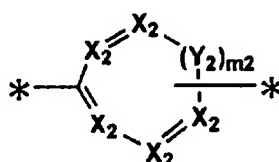
[0664]

[Chemical formula 424]

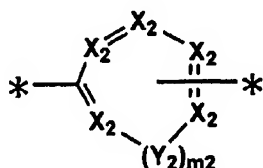
一般式(C7-16)



一般式(C7-17)



一般式(C7-18)



[0665]-CRd<sub>1</sub>= or -N=, and  $Y_2$  of  $X_2$  are -NRe<sub>1</sub>-, -C(Rf<sub>1</sub>)<sub>2</sub>-, -O-, or -S- among a formula.



However,  $Rd_1$ ,  $Re_1$ , and  $Rf_1$  are a hydrogen atom or a substituent,  $m_2$  is an integer of 1-3, and \* is a binding site.

[0666]When  $Rd_1$ ,  $Re_1$ , and  $Rf_1$  express a substituent,  $\sigma$  of the substituent is more than -0.90 and 0.50 or less.  $Rc_1$  in a general formula (C7-11) and (C7-12),  $Rc_2$ ,  $Rc_3$ , and  $Rc_4$  are synonymous with  $Ra_1$  in said general formula (C7-1), and  $Ra_2$ .  $n_4$  is an integer of 1-5, and  $n_5$  is an integer of 1-4.

[0667] $\sigma$  value of a substituent in this invention, [ as an example of representation of the substituent not more than more than -0.9 0.5 ] A methyl group, an ethyl group, a cyclo propyl group, n-propyl group, an iso-propyl group, A cyclo butyl group, n-butyl group, an iso-butyl group, n-pentyl group, a cyclohexyl group and an amino group (a methylamino machine, an octyl amino group, an ANIRINO machine, and a dibutylamino machine.) An acetylamino machine, a UREIDO machine (for example, an ECHIRUU RAID machine, an octyl RAID machine, etc.), a hydroxyl machine and an alkyloxy machine (a methoxy group, an ethoxy basis, and a propoxy group.) a dodecyloxy machine and a benzyloxy group halogen atom (a fluorine atom.) a chlorine atom, a bromine atom, a formyl group, and a carbamoyl group (for example, Culver Moyle.) Each basis, such as morpholino KARUBAMOIRU and N-methylcarbamoyl, an alkoxycarbonyl group (for example, each basis, such as methoxy carbonyl and ethoxycarbonyl), an acyl group (for example, each basis, such as ASECHIRU and benzoyl), etc. are mentioned.

[0668]Preferably, it is or more -0.9 0.3 or less substituent also in the above-mentioned substituent, and is a substituent not more than more than -0.9 0.0 in the above-mentioned substituent still more preferably.

[0669] $\sigma$  value is the substituent constant called for from the electronic effects of the substituent exerted on hydrolysis of benzoic ester by Hammett etc.

23 journal OBU organic chemistry, 420-427 (1958), 14 experimental science lectures (Maruzen publishing company), physical organic chemistry (McGrawHill Book: 1940), A Drac design VII volume (Academic Prees New York:1976), It is indicated in detail to C. HANSHU (C. Hansch) of the description, etc. in the structure-activity relationship (Nankodo: 1979) of a medicine, the

20th volume of journal OBU medical chemistry (Journal of Medical Chemistry), 304 pages, and 1977.

[0670] [ compound / which is denoted by said general formula (C7-1), (C7-2), or (C7-3) in this invention ] a phosphorescence compound (it is also called a dopant or a guest compound) -- or, The luminescence wavelength obtained by electric field luminescence in the state where it became an element can use the fluorogenic compound which is a long wave rather than the fluorescence maximum wavelength of the compound denoted by said general formula (C7-1), (C7-2), or (C7-3).

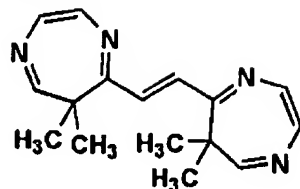
[0671]. It can set to said general formula (C7-1), (C7-2), and (C7-3). As for  $Z_1$ ,  $Z_2$ ,  $Z_3$ ,  $Z_4$ ,  $Z_5$ ,  $Z_6$  and  $Ra_1$ ,  $Ra_2$ ,  $Ra_3$ ,  $Ra_4$ ,  $Ra_5$ ,  $Ra_6$ , and  $Ra_7$ , in addition to the aforementioned definition, sigma p also includes the substituent beyond less than -0.90 0.50. Specifically, a cyano group, a trifluoromethyl group, a nitro group, etc. are mentioned.

[0672] Although the example of these compounds is shown below, it is not limited to these.

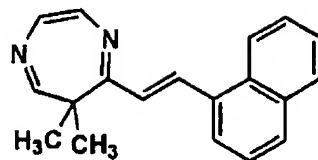
[0673]

[Chemical formula 425]

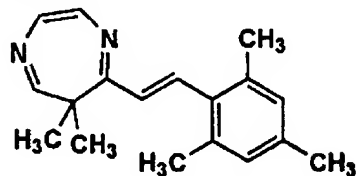
C7-A-1



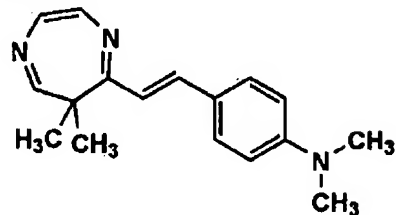
C7-A-2



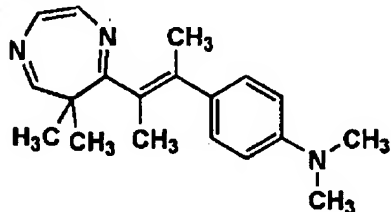
C7-A-3



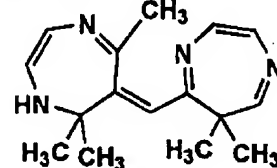
C7-A-4



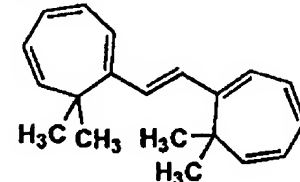
C7-A-5



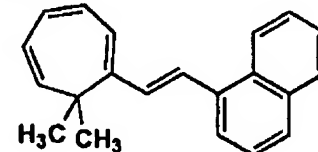
C7-A-6



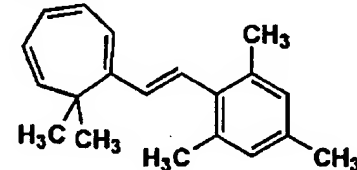
C7-A-7



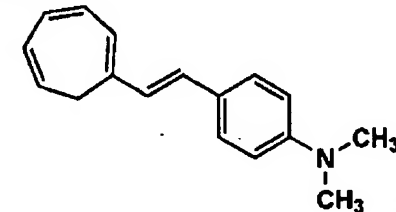
C7-A-8



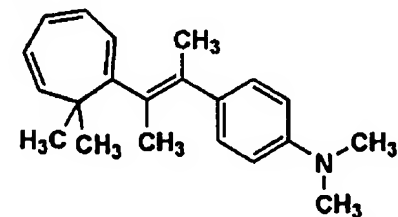
C7-A-9



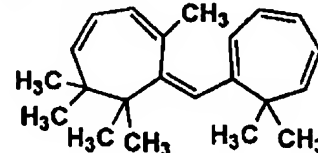
C7-A-10



C7-A-11



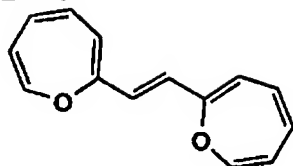
C7-A-12



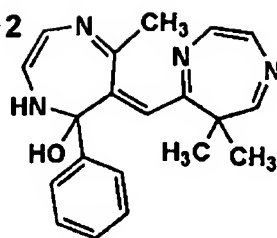
[0674]

[Chemical formula 426]

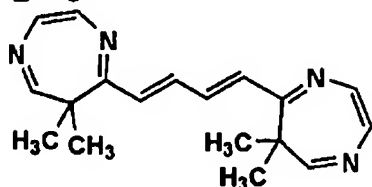
C7-B-1



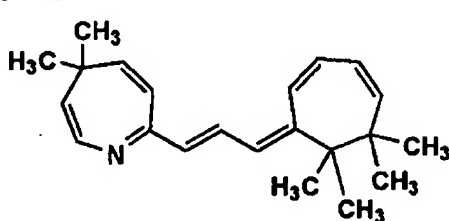
C7-B-2



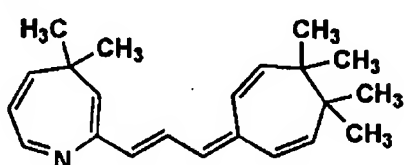
C7-B-3



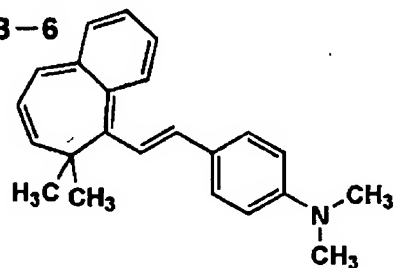
C7-B-4



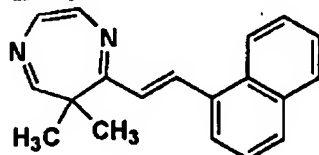
C7-B-5



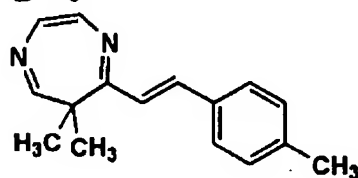
C7-B-6



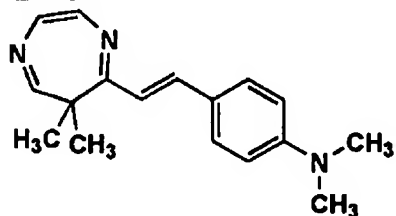
C7-B-7



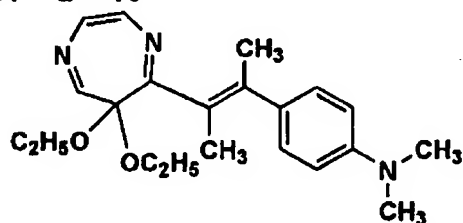
C7-B-8



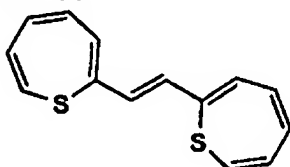
C7-B-9



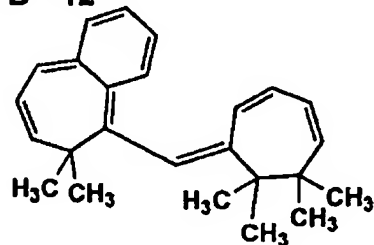
C7-B-10



C7-B-11



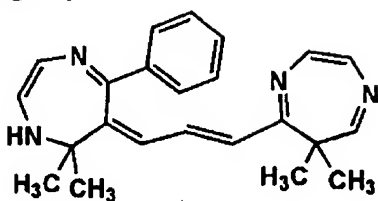
C7-B-12



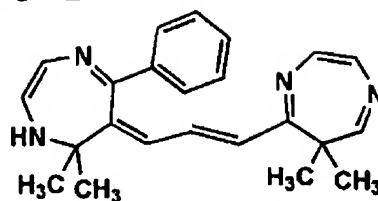
[0675]

[Chemical formula 427]

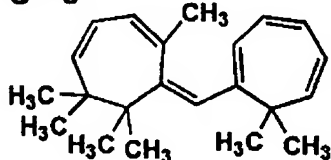
C7-C-1



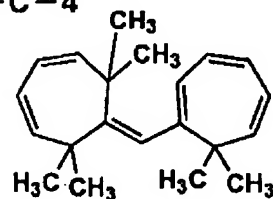
C7-C-2



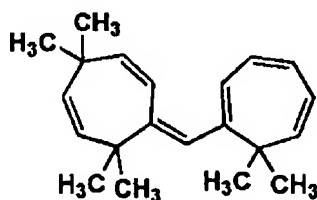
C7-C-3



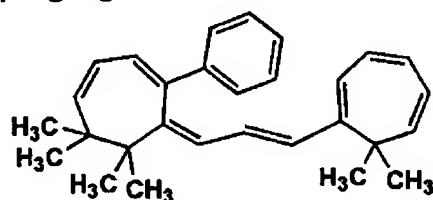
C7-C-4



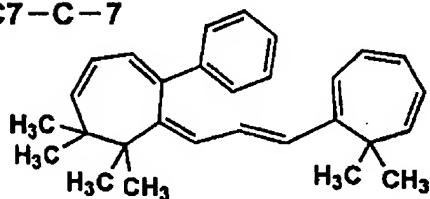
C7-C-5



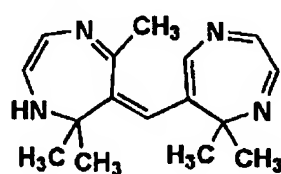
C7-C-6



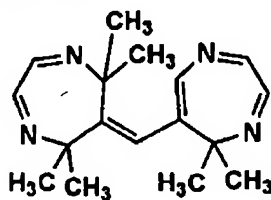
C7-C-7



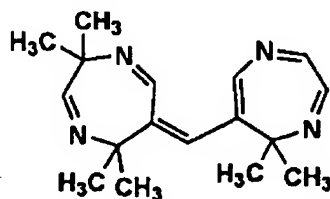
C7-C-8



C7-C-9



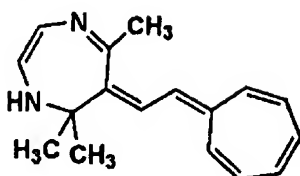
C7-C-10



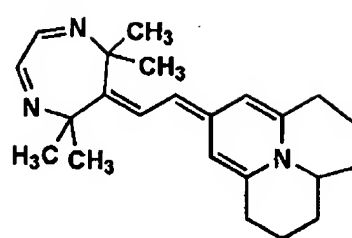
[0676]

[Chemical formula 428]

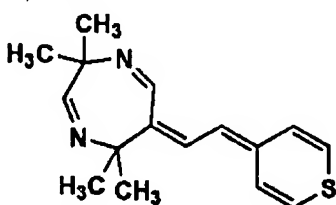
C7-D-1



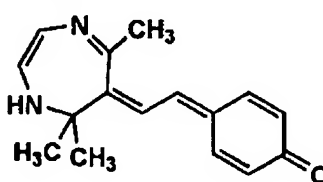
C7-D-2



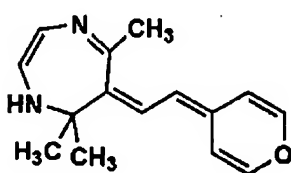
C7-D-3



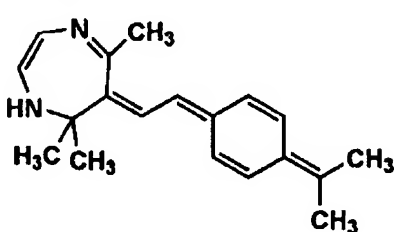
C7-D-4



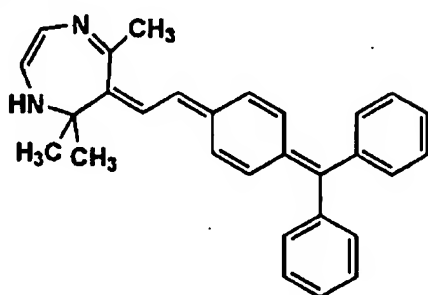
C7-D-5



C7-D-6



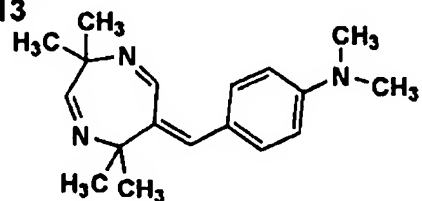
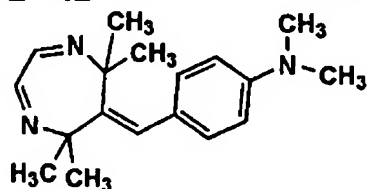
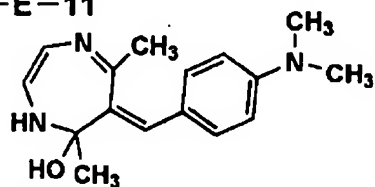
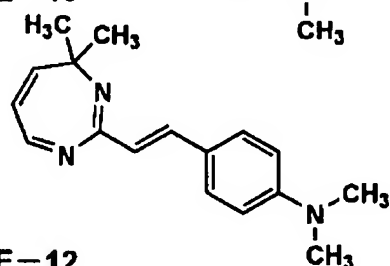
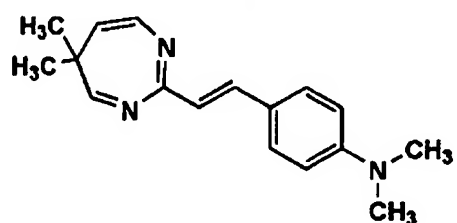
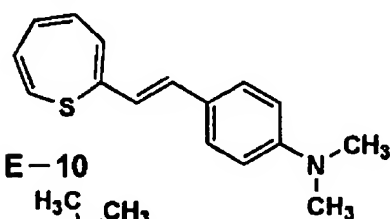
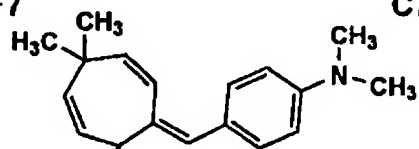
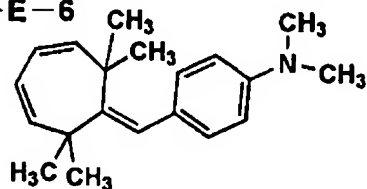
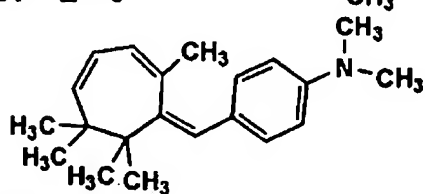
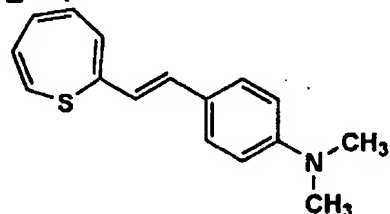
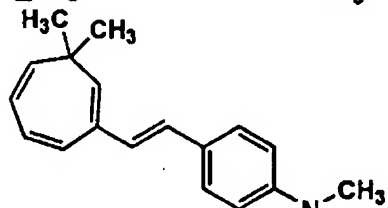
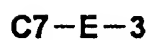
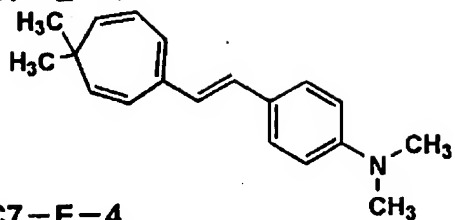
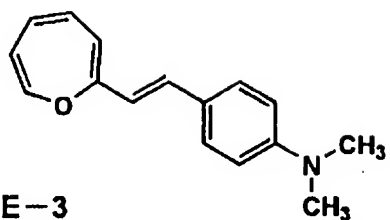
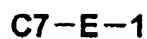
C7-D-7





[0677]

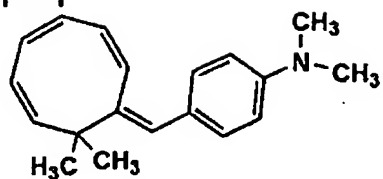
[Chemical formula 429]



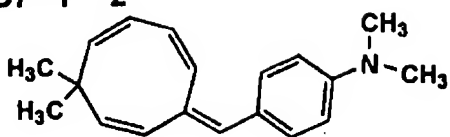
[0678]

[Chemical formula 430]

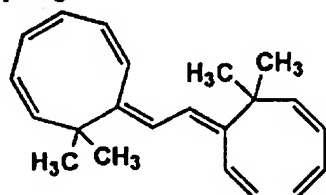
C7-F-1



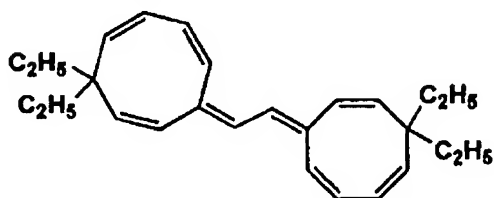
C7-F-2



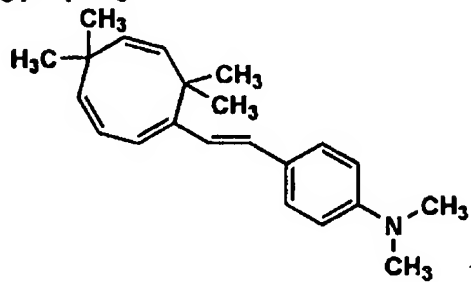
C7-F-3



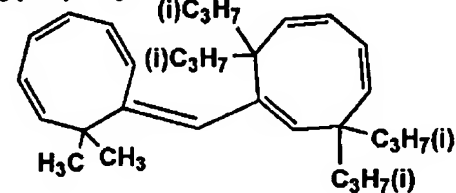
C7-F-4



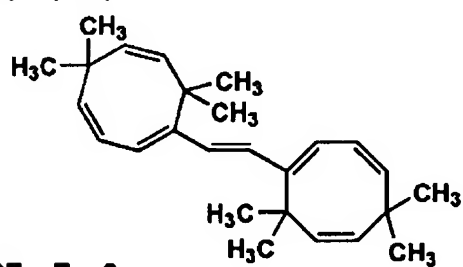
C7-F-5



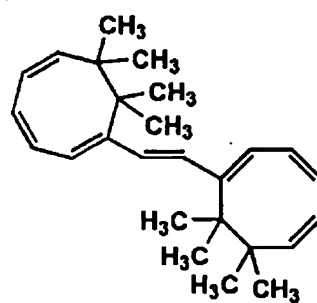
C7-F-6



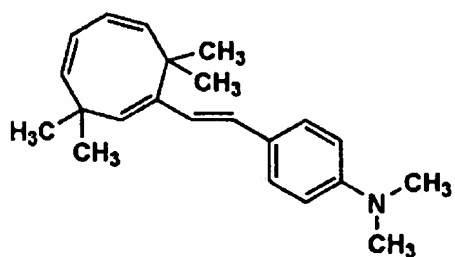
C7-F-7



C7-F-8



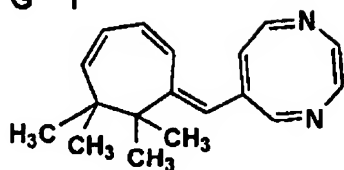
C7-F-9



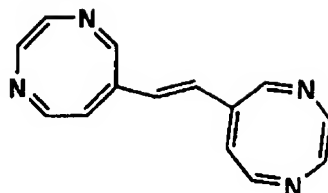
[0679]

[Chemical formula 431]

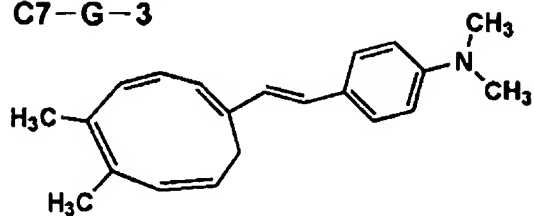
C7-G-1



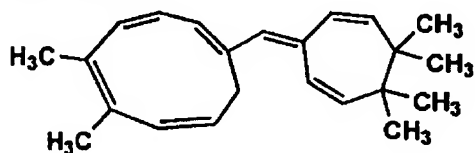
C7-G-2



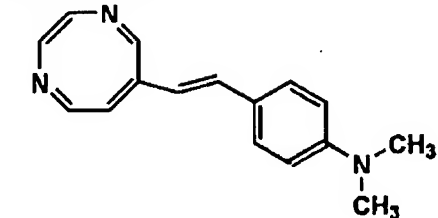
C7-G-3



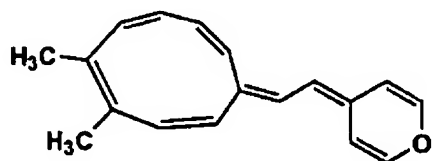
C7-G-4



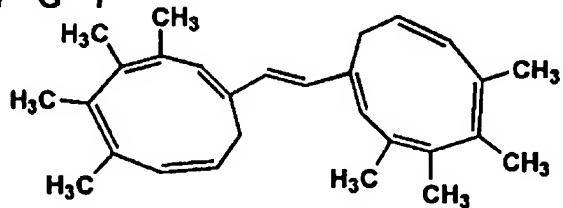
C7-G-5



C7-G-6



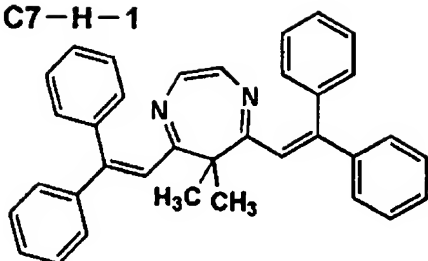
C7-G-7



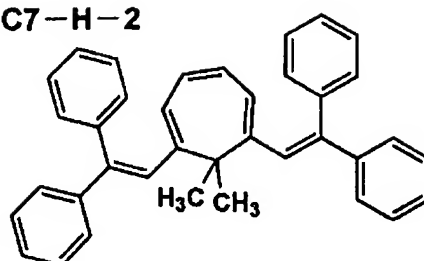
[0680]

[Chemical formula 432]

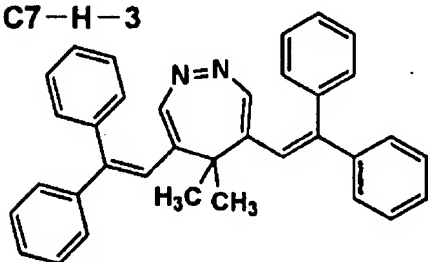
C7-H-1



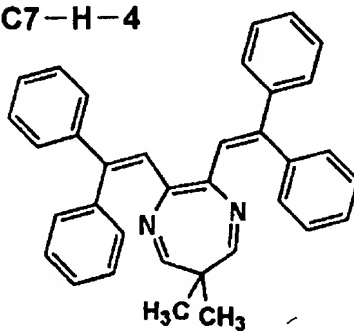
C7-H-2



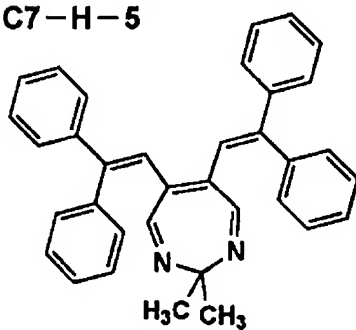
C7-H-3



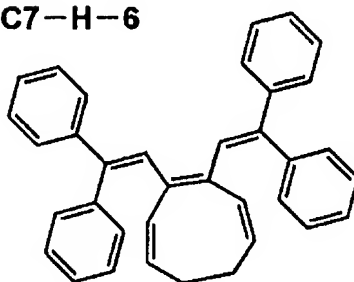
C7-H-4



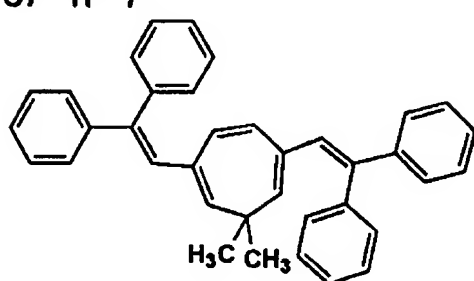
C7-H-5



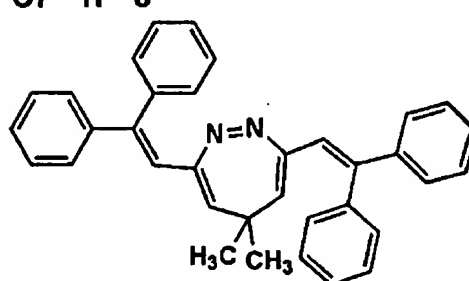
C7-H-6



C7-H-7



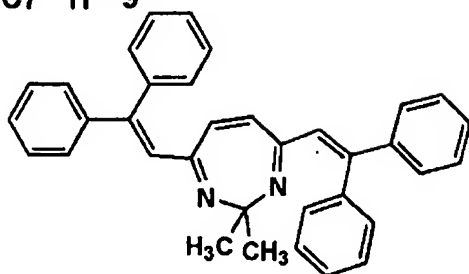
C7-H-8



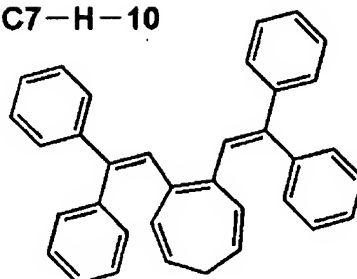
[0681]

[Chemical formula 433]

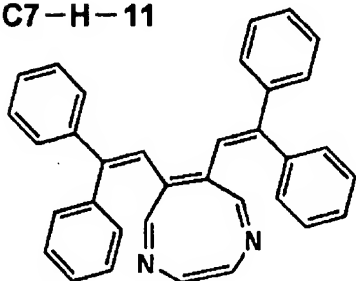
**C7-H-9**



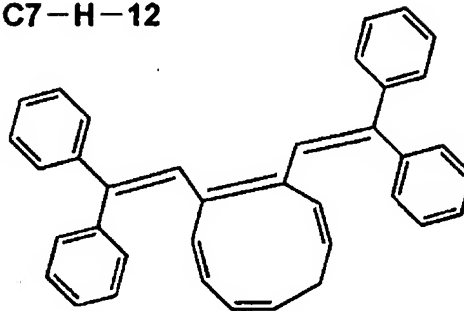
**C7-H-10**



**C7-H-11**



**C7-H-12**

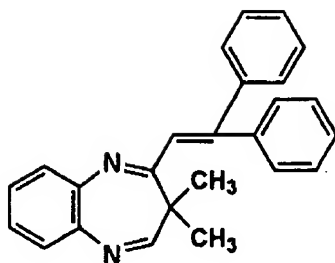


[0682]

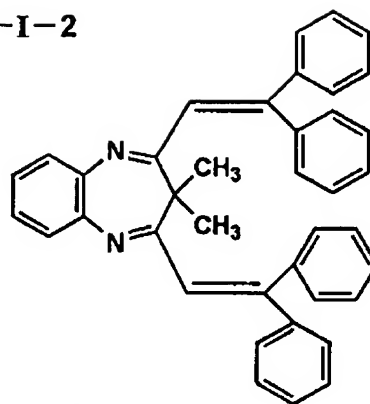


[Chemical formula 434]

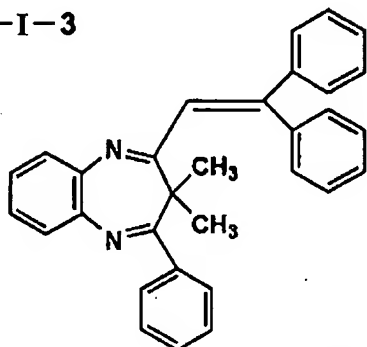
C7-I-1



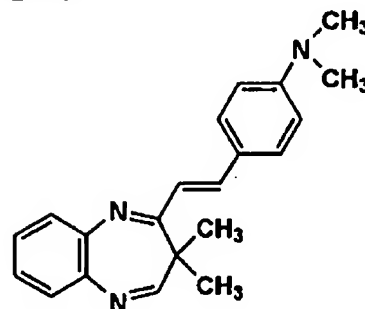
C7-I-2



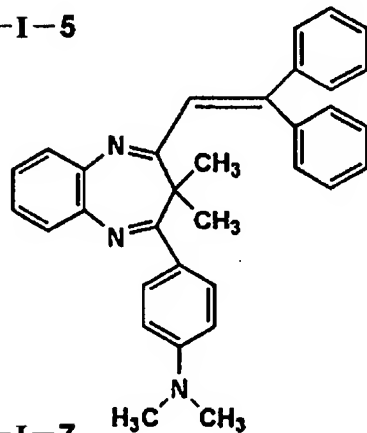
C7-I-3



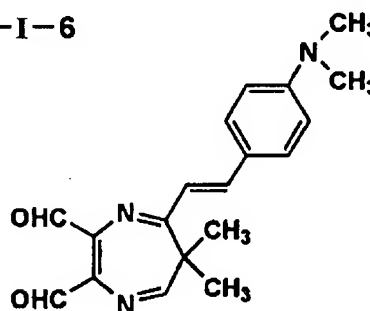
C7-I-4



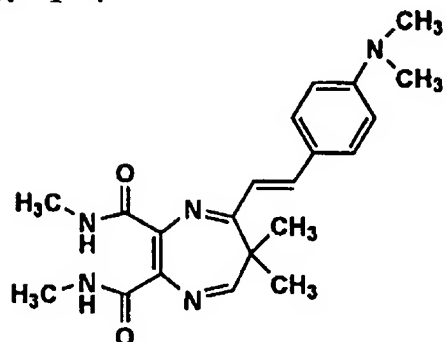
C7-I-5



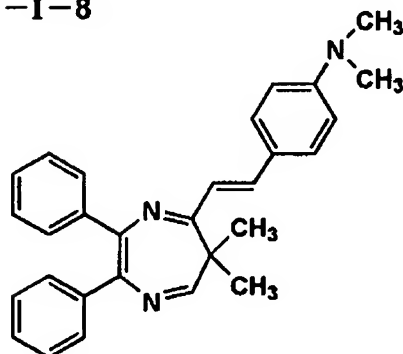
C7-I-6



C7-I-7



C7-I-8



[0683]The compound of this invention is a compound which has strong fluorescence in a solid state.

It excels also in electric field luminescence and can be effectively used as a luminescent material.

[0684]The synthesizing method of the compound of this invention is shown below.

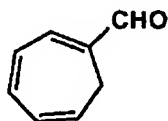
[0685]<Synthesizing method> 1-Hol \*\*\*\*- 1 and 3 and 5-cycloheptatriene (1-1) were compounded by the method (the 66th volume No. 1 275 pages of Bull.Chem.Soc.Jpn. (1993)) given in document.

[0686]\*\*\*\*\*- p-trill amine was conventionally used as the Wittg reagent (1-2) by the publicly known method. Next, 0.5 g of potassium t-butoxide was added, having dissolved into dry THF100ml and agitating 0.5 (1-1)g and 2 (1-2)g under a nitrogen air current. It was neglected overnight, after agitating at room temperature for 4 hours. Ethyl acetate and water were added to the obtained mixture, and the organic layer was extracted. The solvent was distilled off after dryness with magnesium sulfate. Column refining was performed and 0.5 g of compounds (C7-A-10) of this invention were obtained (45% of \*\*\*\*).

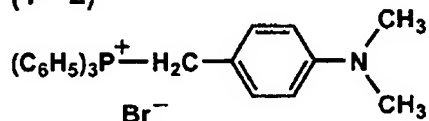
[0687]

[Chemical formula 435]

(1-1)



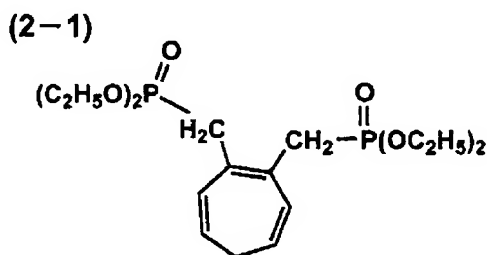
(1-2)



[0688]<Synthesizing method> (2-1) 5.0 g and 4.6 g of benzophenone were dissolved in 100 ml of dimethyl sulfoxide, and 2.8 g of potassium t-butoxide was added to this, and under the nitrogen air current, it was neglected overnight, after agitating at room temperature for 4 hours. The crystal which added 100 ml of methanol to the obtained mixture, and deposited was filtered. 100 ml of methanol washed filtration output 3 times continuously 3 times with 100 ml of water, column refining was performed, and 3.0 g was obtained for the compound (C7-H-10) of this invention (30% of \*\*\*\*).

[0689]

[Chemical formula 436]



[0690]The above-mentioned compound checked with the NMR spectrum and the mass spectrum.

[0691]As another fluorogenic compound used for a host compound etc. in this invention, it is the compound which contains the boron atom in a molecule, and is a compound denoted by said general formula (C8-1) preferably. In a general formula (C8-1), B expresses a boron atom and  $R_{11}$ ,  $R_{12}$ , and  $R_{13}$  express the substituent of 1 value. However, at least one of  $R_{11}$ ,  $R_{12}$ , and the  $R_{13}$  expresses an aromatic series machine. [ as a substituent of the 1 value denoted by  $R_{11}$ ,  $R_{12}$ , and  $R_{13}$  ] an alkyl group (a methyl group, an ethyl group, i-propyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, aryl groups (a phenyl group and a naphthyl group.), such as a cyclohexyl

group and a benzyl group alkoxy groups (a methoxy group.), such as p-trill machine and p-chlorophenyl machine Aryloxy groups, such as an ethoxy basis, i-propoxy group, and a butoxy machine (phenoxy group etc.), An alkylthio group (a methylthio group, an ethyl thio group, i-pro PIRUKIO machine, etc.), arylthio groups (phenylthio group etc.) and a halogen atom (a fluorine atom.) A cyano group, a nitro group, heterocyclic machines, etc. (a pyrrolyl machine, a pyrrolidyl machine, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, a benzoxazolyl machine, etc.), such as a chlorine atom, a bromine atom, and an iodine atom, are mentioned. As an aromatic series machine, the above-mentioned aryl group and heteroaryl groups (a pyrrolyl machine, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, benzoxazolyl, etc.) are mentioned. Preferably, it is a time of all of  $R_{11}$ ,  $R_{12}$ , and  $R_{13}$  being aromatic series machines.

[0692]Next, a general formula (C8-2) is explained. In a general formula (C8-2), B expresses a boron atom,  $Ar_{21}$  and  $Ar_{22}$  express an aromatic series machine, A expresses the basis of 2 - 15 value, and n expresses 2-15. What has an aromatic series machine [ be / the same as that of a general formula (C8-1) / it ] denoted by  $Ar_{21}$  and  $Ar_{22}$  is mentioned. Again. Moreover the basis of 2 denoted by A - 15 values is a basis which the aromatic series unit containing a monocycle machine, a condensed multi-ring machine, a monocycle, or condensed multi-ring connected preferably, the basis of 2 connected by the atom which consists of carbon, oxygen, nitrogen, and a sulfur atom - 15 values may be sufficient as these rings.

[0693]As an example of A, benzene, toluene, NAFUTAREN, anthracene, Phenanthrene, full OREN, pyrene, PERIREN, triphenylene, AZUREN, a fluorenone, a franc, CHIOFEN, pyrrole, pyridine, OKISAZORU, pyrazine, pyrimidine, and oxadiazole -- and, [ doria ] Indore, quinoline, iso quinoline, carbazole, AKURIJIN, the residue of the aromatic series ring which is not replaced [ substitution, such as benzothia ZORU, a phenanthro phosphorus, and cinchona bark KURIDON, or ] or a condensation aromatic ring -- further, Biphenyl, terphenyl, binaphthyl, bird phenyl benzene, diphenyl anthracene, The residue which aromatic ring structure units, such as rubrene, BIPIRIJIN, biquinoline, and bithiophene, connected directly, Aromatic ring structure units, such as SUCHIRUBEN, diphenyl methane, diphenyl ether, benzophenone, diphenyl SURUFIDO, and bird phenylamine, are the residues of a compound which have the frame connected via the non-aromatic ring structure unit.

[0694]Next, a general formula (C8-3) is explained. In a general formula (C8-3), B expresses a boron atom,  $Ar_{31}$  expresses the aromatic series ring of a monocycle, and  $R_{31}$ ,  $R_{32}$ ,  $R_{33}$ , and  $R_{34}$  express the substituent of 1 value. n expresses 1-5. as the example of the aromatic series machine of a monocycle denoted by  $Ar_{31}$  -- benzene, a franc, CHIOFEN, pyrrole, OKISAZORU, imidazole, thia ZORU, and doria -- ZORU, pyridine, PIRIDAJIN, pyrimidine, pyrazine, triazine, etc. are mentioned. The aromatic series machine of these monocycles may be replaced further. The thing same as a substituent of the 1 value denoted by  $R_{41}$ ,  $R_{42}$ ,  $R_{43}$ , and  $R_{44}$  as a general formula (C8-1) is mentioned.

[0695][ the aromatic series machine which the compound of a general formula (C8-3) is preferably denoted by a general formula (C8-4), and is denoted by  $Ar_{41}$ ,  $Ar_{42}$ ,  $Ar_{43}$ , and  $Ar_{44}$  ] The same thing as  $Ar_{21}$  of a general formula (C8-2) is mentioned, and the thing same as an example in case  $R_{45}$  is a substituent of 1 value as the substituent illustrated by the general formula (C8-1) is mentioned.

[0696]Next, a general formula (C8-5) is explained. B expresses a boron atom, and C expresses a carbon atom, and  $A_{51}$ ,  $A_{52}$ ,  $A_{53}$ ,  $A_{54}$ ,  $A_{55}$ , and  $A_{56}$  express a carbon atom or a nitrogen atom,  $Z_{51}$ ,  $Z_{52}$ , and  $Z_{53}$  express an atomic group required to form an aromatic series ring,  $R_{51}$ ,  $R_{52}$ ,  $R_{53}$ ,  $R_{54}$ ,  $R_{55}$ , and  $R_{56}$  express the substituent of a hydrogen atom or 1 value independently, respectively, and at least four of  $R_{51}$  -  $R_{56}$  express a substituent.  $R_{57}$ ,  $R_{58}$ , and  $R_{59}$  express the substituent of a hydrogen atom or 1 value independently, respectively, and l3, n3, and m3 express 0-7 independently, respectively. With the aromatic series ring formed by  $Z_{51}$ ,  $Z_{52}$ , and  $Z_{53}$ , the aromatic series ring or condensation aromatic ring illustrated by A of the general formula (C8-2) is mentioned. The thing same as an example of the substituent of 1 value denoted by  $R_{51}$  -  $R_{59}$  as the substituent illustrated by the general formula (C8-1) is mentioned.

[0697]It is a time of all of  $R_{51}$  -  $R_{56}$  being the substituents of 1 value preferably, and is a time of

$R_{51} - R_{56}$  being an alkyl group, an alkoxy group, an aryloxy group, or a halogen atom independently, respectively more preferably.

[0698]Next, a general formula (C8-6) is explained.  $Ar_{61}$ ,  $Ar_{62}$ ,  $Ar_{63}$ , and  $Ar_{64}$  express respectively the aromatic series machine which is not replaced [ substitution or ] independently,  $Q_{61}$  expresses an aromatic series machine, and  $n_4$  expresses 1-5. What has an aromatic series machine [ be / the same as that of  $Ar_{21}$  of a general formula (C8-2) / it ] denoted by  $Ar_{61}$ ,  $Ar_{62}$ ,  $Ar_{63}$ , and  $Ar_{64}$  is mentioned, and what has an aromatic series machine [ be / the same as that of  $Ar_{31}$  of a general formula (C8-3) / it ] denoted by  $Q_{61}$  is mentioned.

[0699]As for the molecular weight of a host compound, it is preferred that it is 600-2000.  $T_g$  (glass transition temperature) goes up that molecular weights are 600-2000, heat stability improves, and an element life is improved. Molecular weights are 800-2000 more preferably.

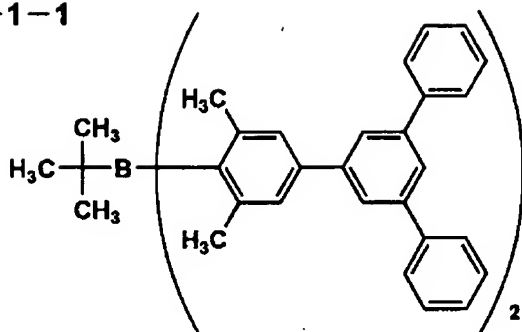
[0700]Although the example of a concrete compound is shown below, it is not limited to these.

[0701]

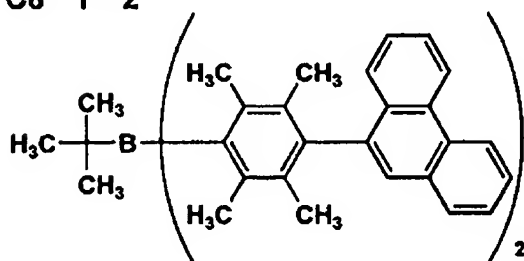
[Chemical formula 437]



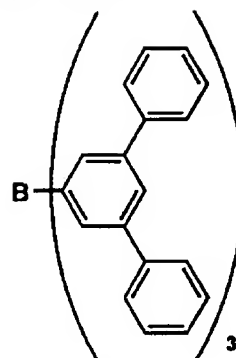
C8-1-1



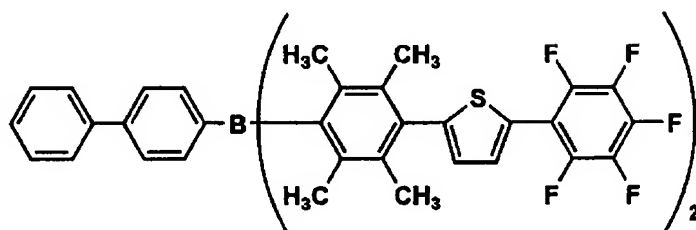
C8-1-2



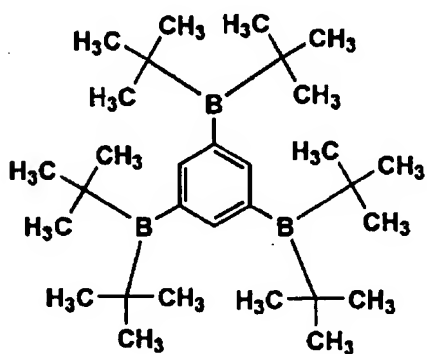
C8-1-3



C8-1-4



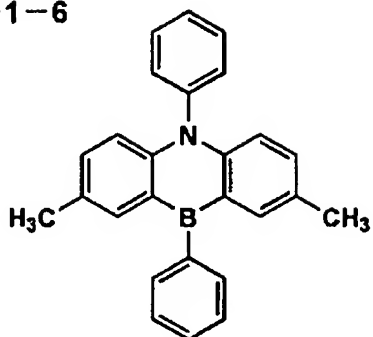
C8-1-5



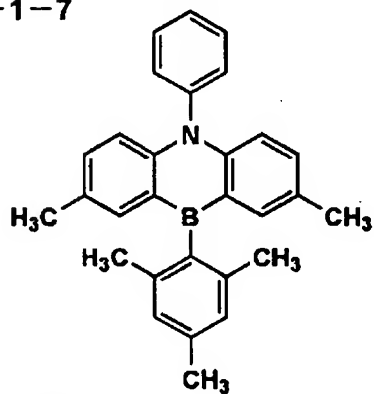
[0702]

[Chemical formula 438]

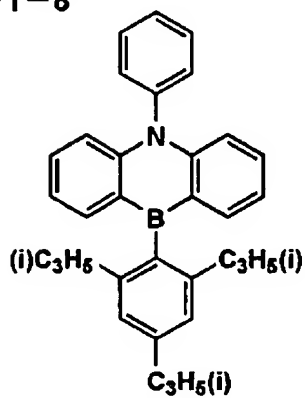
C8-1-6



C8-1-7



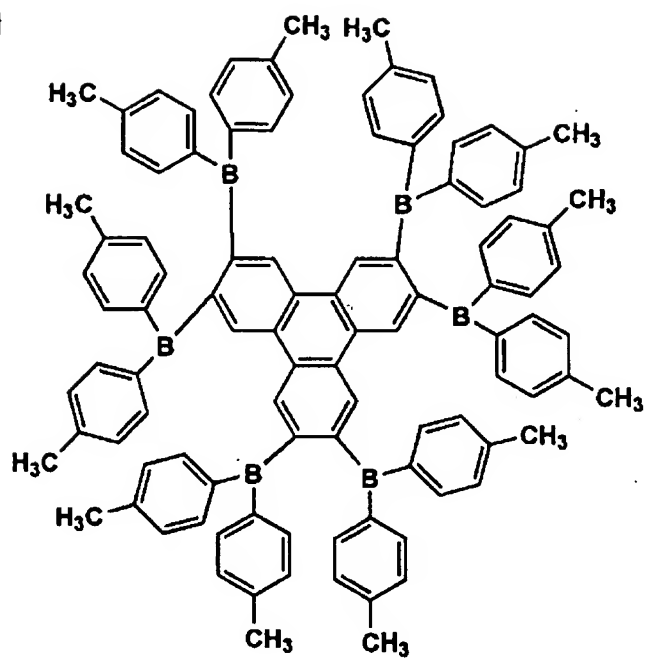
C8-1-8



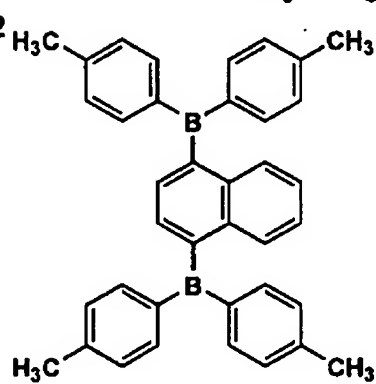
[0703]

[Chemical formula 439]

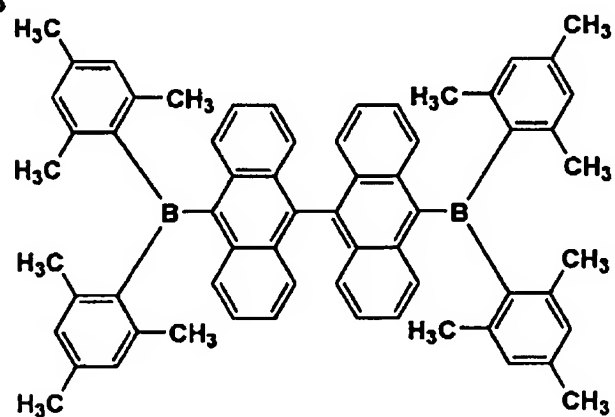
C8-2-1



C8-2-2

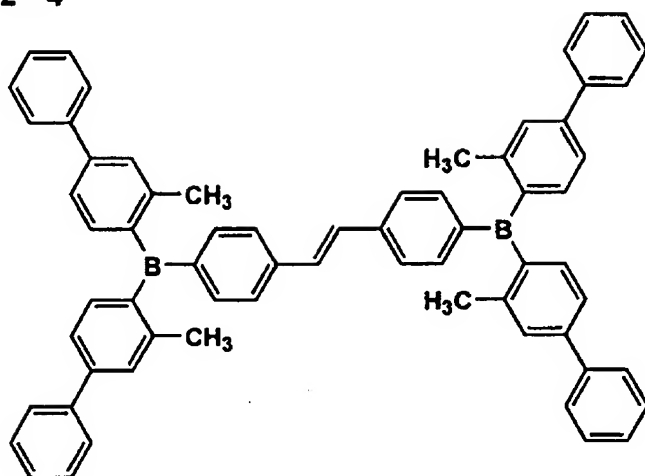
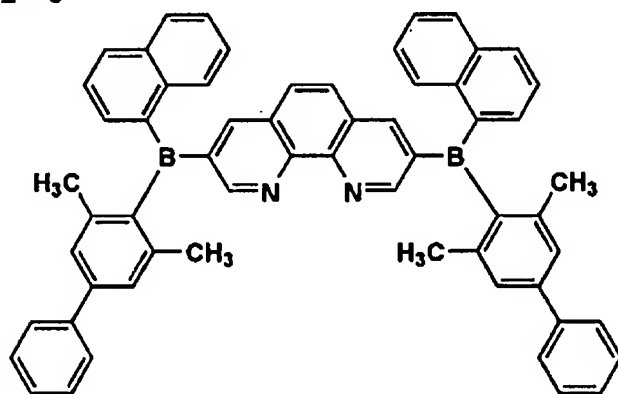


C8-2-3



[0704]

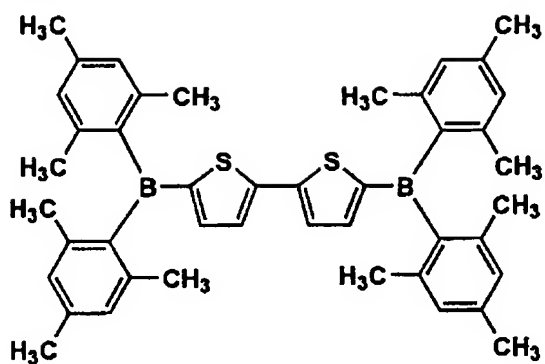
[Chemical formula 440]

**C8-2-4****C8-2-5**

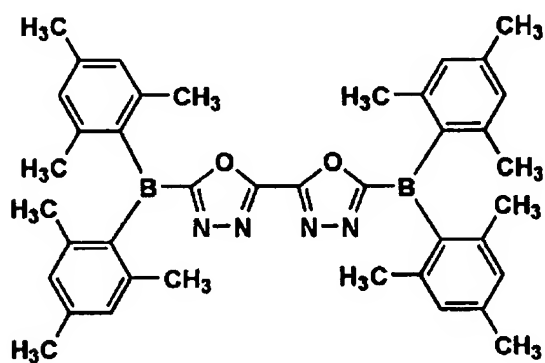
[0705]

[Chemical formula 441]

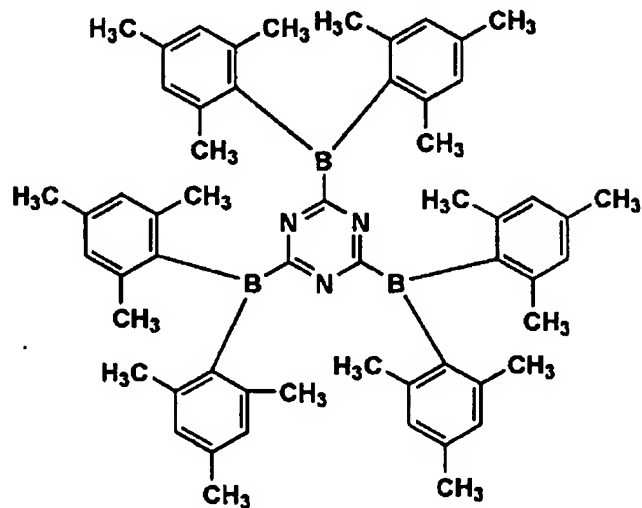
C8-3-1



C8-3-2



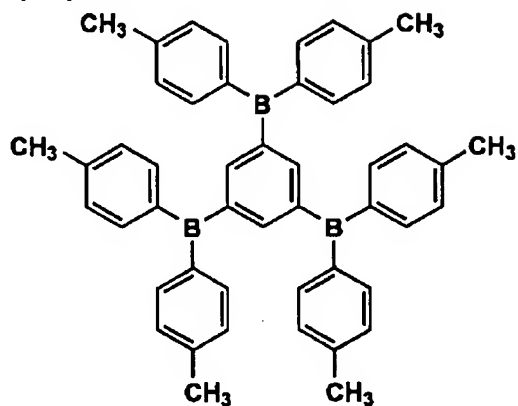
C8-3-3



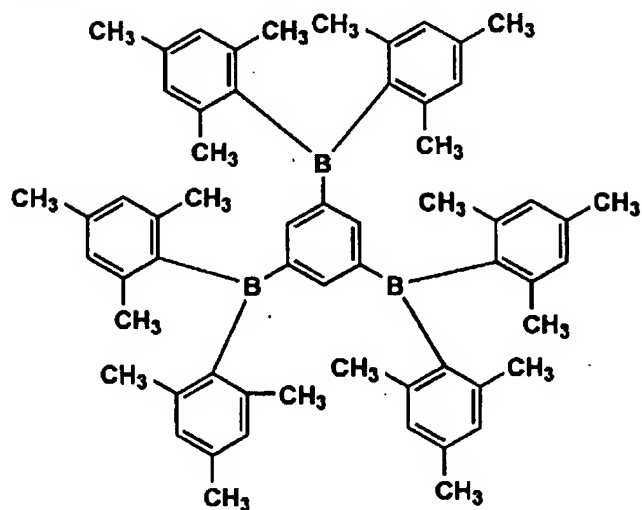
[0706]

[Chemical formula 442]

C8-4-1



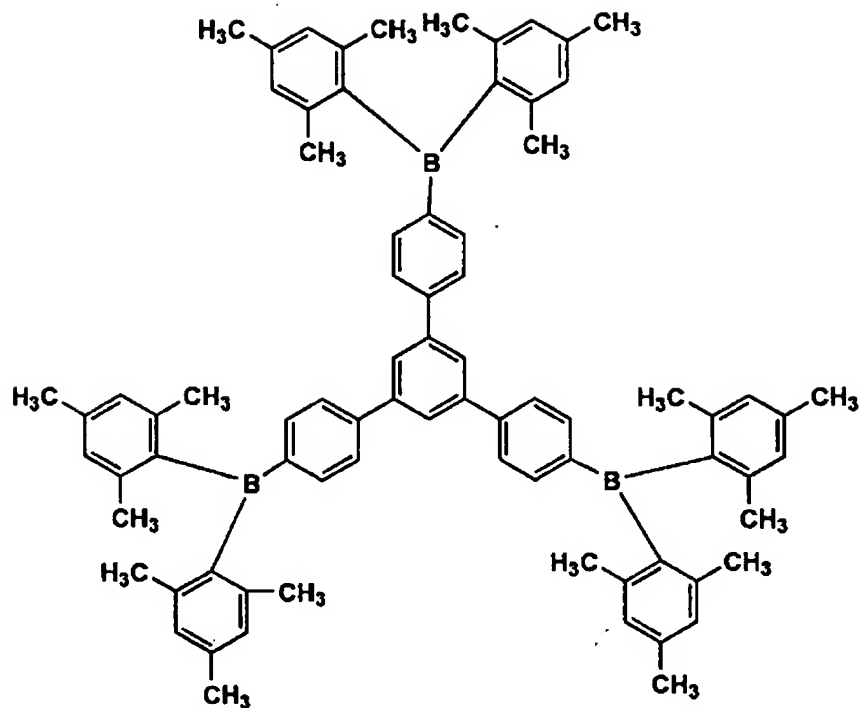
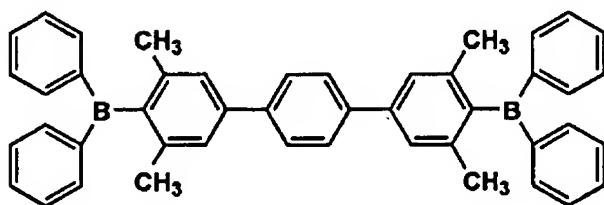
C8-4-2



[0707]



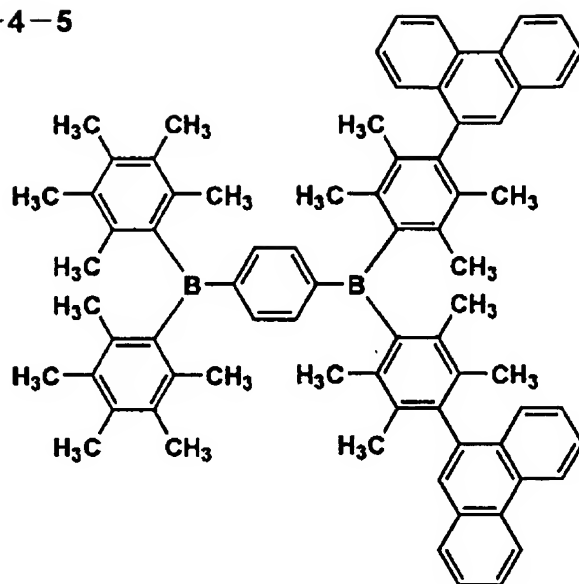
[Chemical formula 443]

**C8-4-3****C8-4-4**

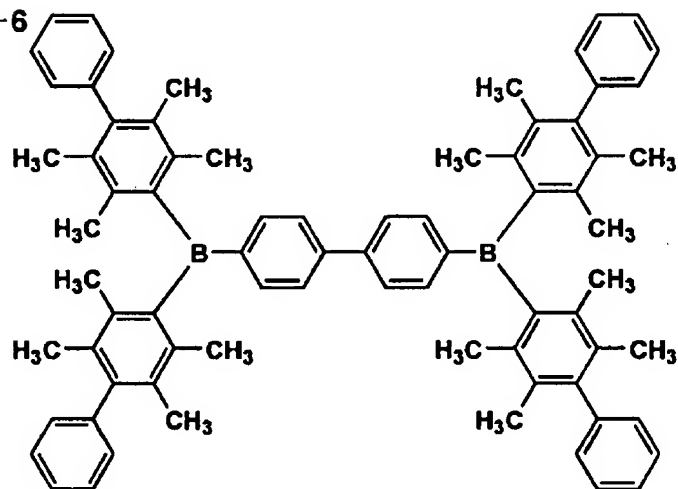
[0708]

[Chemical formula 444]

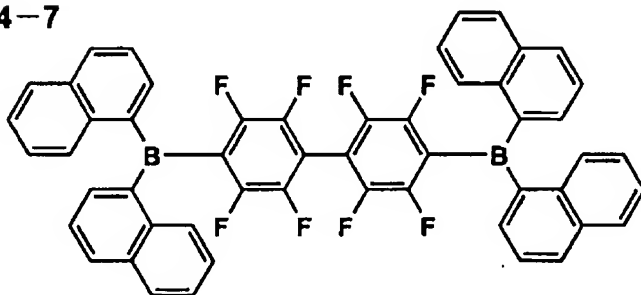
C8-4-5



C8-4-6



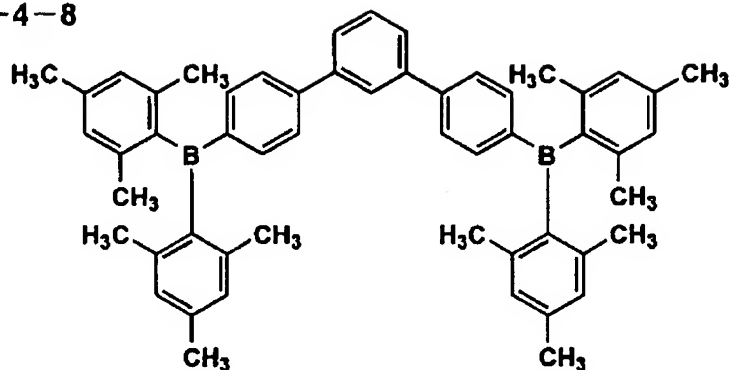
C8-4-7



[0709]

[Chemical formula 445]

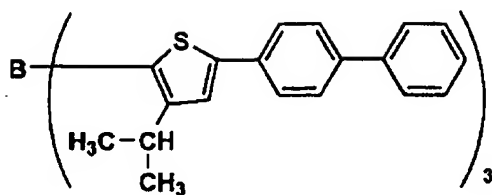
C8-4-8



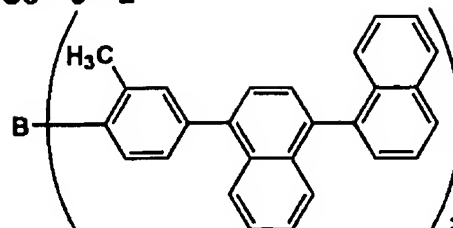
[0710]

[Chemical formula 446]

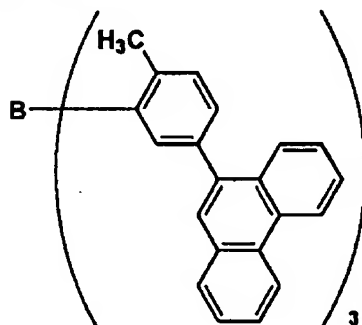
**C8-5-1**



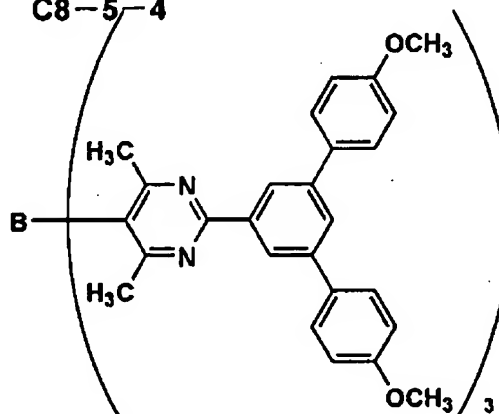
**C8-5-2**



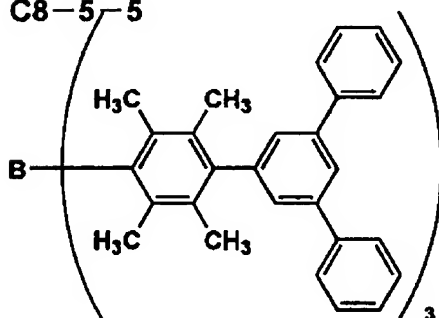
**C8-5-3**



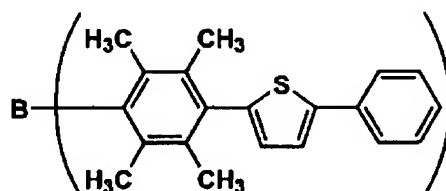
**C8-5/4**



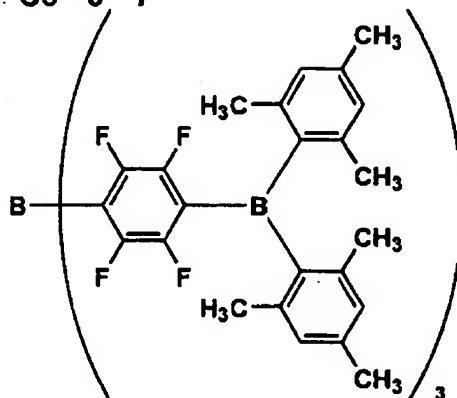
**C8-5/-5**



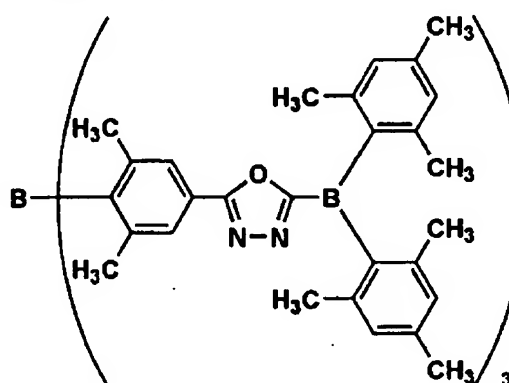
**C8-5-6**



**C8-5-7**



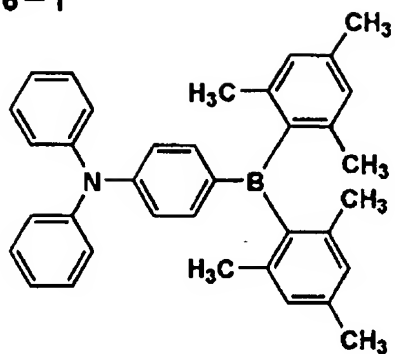
**C8-5-8**



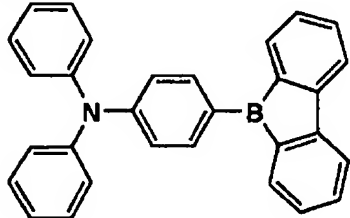
[0711]

[Chemical formula 447]

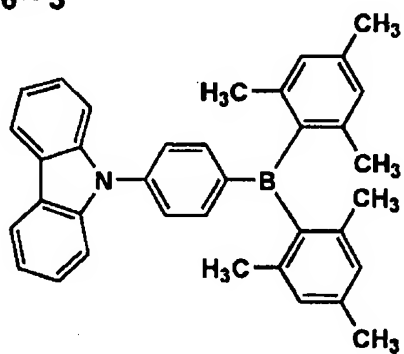
C8-6-1



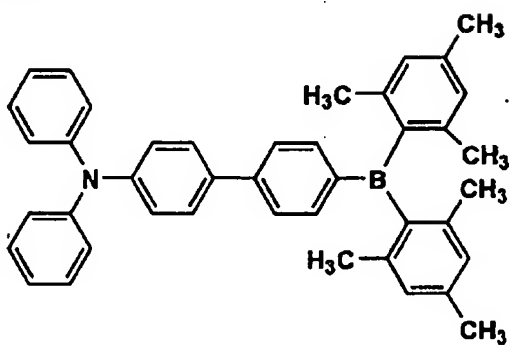
C8-6-2



C8-6-3



C8-6-4

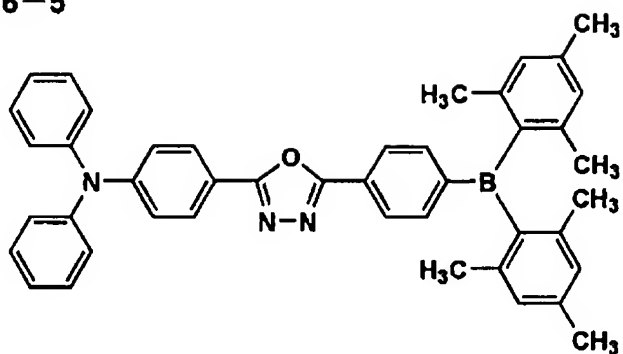




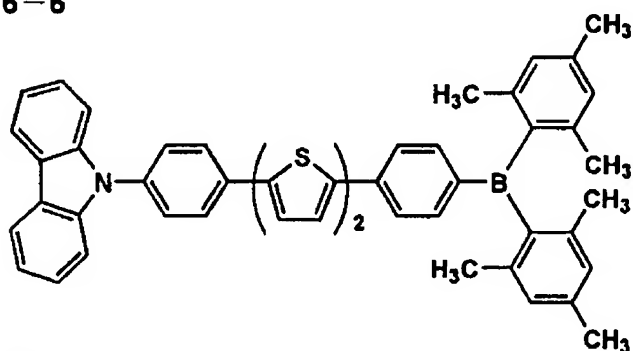
[0712]

[Chemical formula 448]

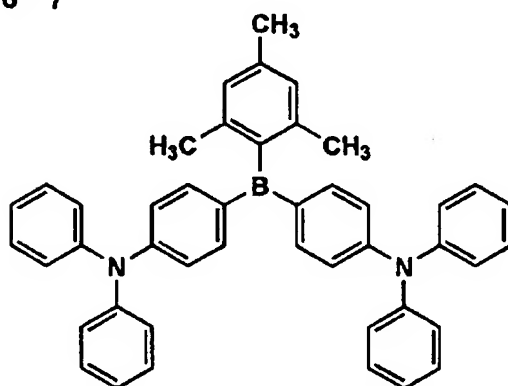
C8-6-5



C8-6-6



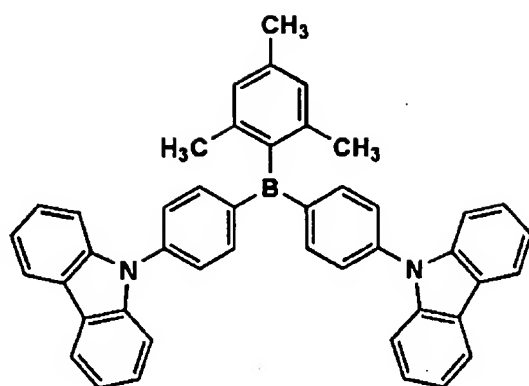
C8-6-7



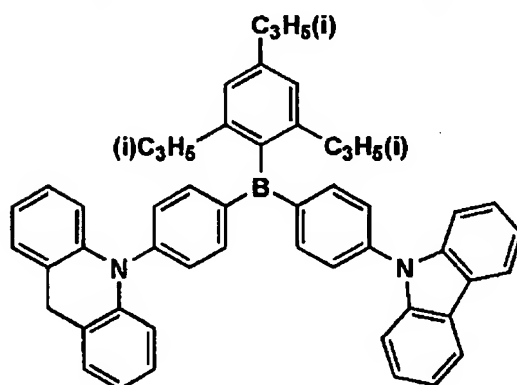
[0713]

[Chemical formula 449]

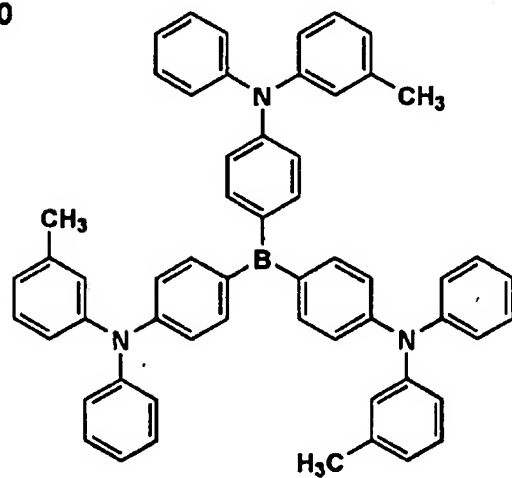
C8-6-8



C8-6-9

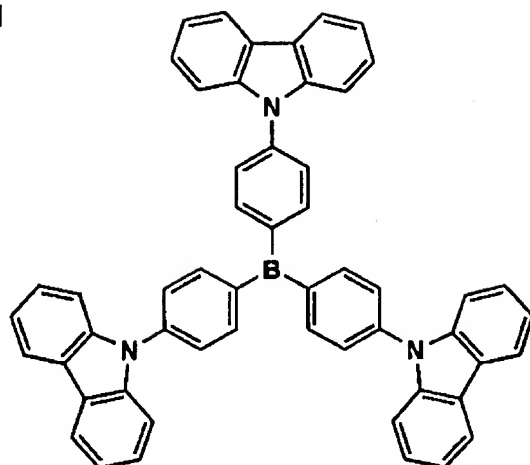
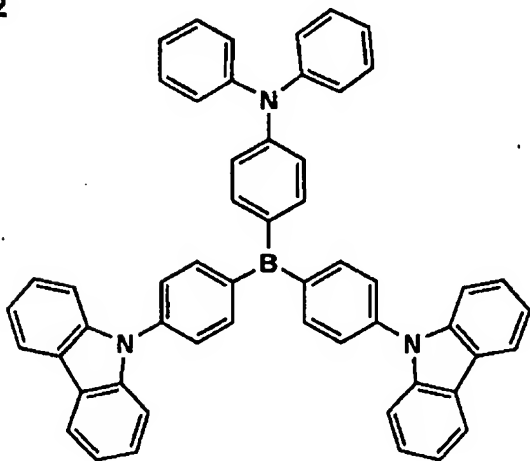


C8-6-10



[0714]

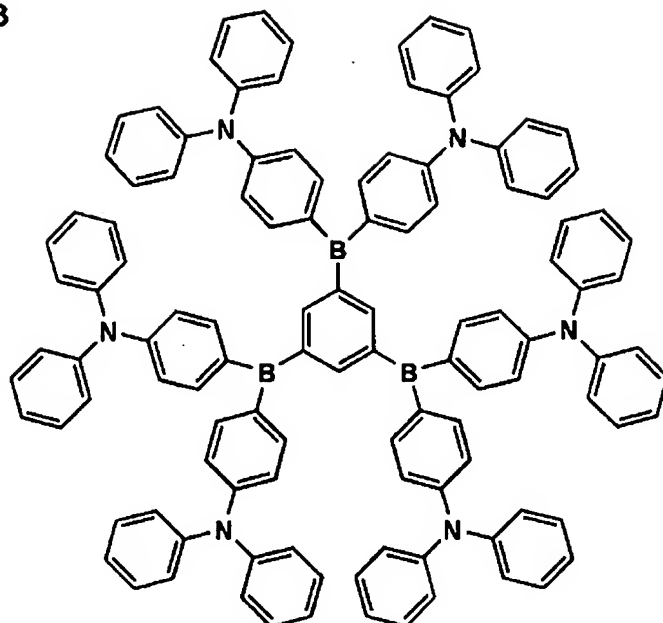
[Chemical formula 450]

**C8-6-11****C8-6-12**

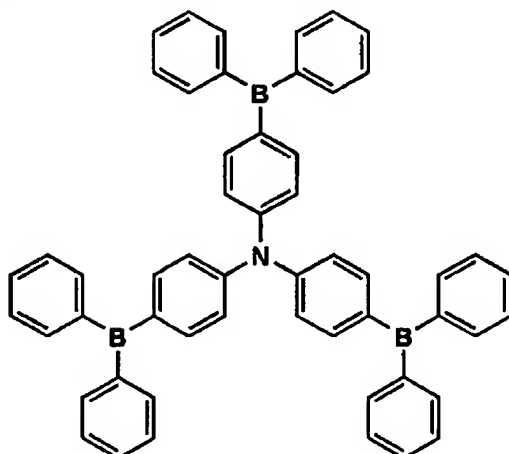
[0715]

[Chemical formula 451]

C8-6-13



C8-6-14



[0716] Although these compounds can be manufactured by a publicly known method, the method indicated, for example to JP,2001-93670,A etc. can be used.

[0717] This invention persons The result of having repeated examination wholeheartedly about the fluorogenic compound which constitutes the luminous layer containing a phosphorescent dopant compound, and at least one layer formed between the negative

poles, When the ratio ( $F/(H+F)$ ) of a fluorine atom to total of the hydrogen atom and fluorine atom in the fluorescence maximum wavelength, a molecular weight, and a molecule took a specific value, it found out that improvement in luminescence luminosity and a life was obtained. The fluorescence maximum wavelength was 415 nm or less, molecular weights are 500-2000, luminescence luminosity is high, and, specifically, as for the organic electroluminescence element whose ratios of a fluorine atom to total of the hydrogen atom and fluorine atom in a molecule are 0-0.9, the life found out a long time.

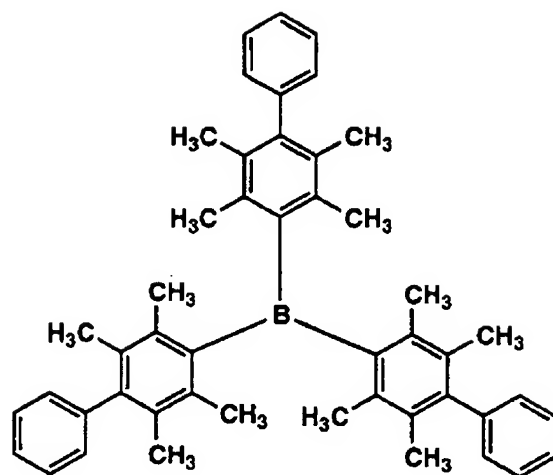
[0718]As for the ratio of a fluorine atom to total of the hydrogen atom and fluorine atom in a molecule, in order to reveal the effect of this invention more, as for the fluorescence maximum wavelength of the above-mentioned compound, 405 nm or less is preferred, as for a molecular weight, 700-2000 are preferred, and 0.1-0.7 are preferred. As for the fluorescence maximum wavelength of the host compound of a luminous layer, 415 nm or less is preferred, and its 405 nm or less is more preferred. As for the fluorescence maximum wavelength of the compound which constitutes a luminous layer and at least one layer formed between anodes, 415 nm or less is preferred.

[0719]The electronic transportation material (it serves as electron hole prevention material) which the electron transport layer of at least one layer is formed between the negative pole and a luminous layer, and is used for this electron transport layer in this invention is [ a fluorescence maximum wavelength ] 415 nm or less, Molecular weights are 500-2000 and the ratio ( $F/(H+F)$ ) of a fluorine atom to total of the hydrogen atom and fluorine atom in a molecule is the electronic transportation material (it may be hereafter called the electronic transportation material in this invention) which are 0-0.9. When this electronic transportation material is plurality, it is preferred that the electron transport layer which adjoins the luminous layer surface by the side of the negative pole comprises electronic transportation material in this invention. Although the example of this electronic transportation material is given to below, this invention is not limited to this.

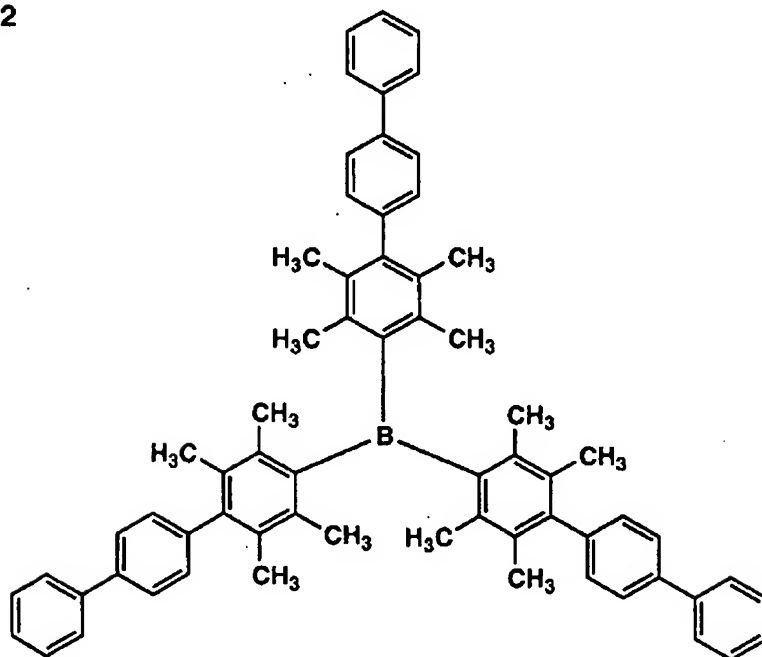
[0720]

[Chemical formula 452]

1



2

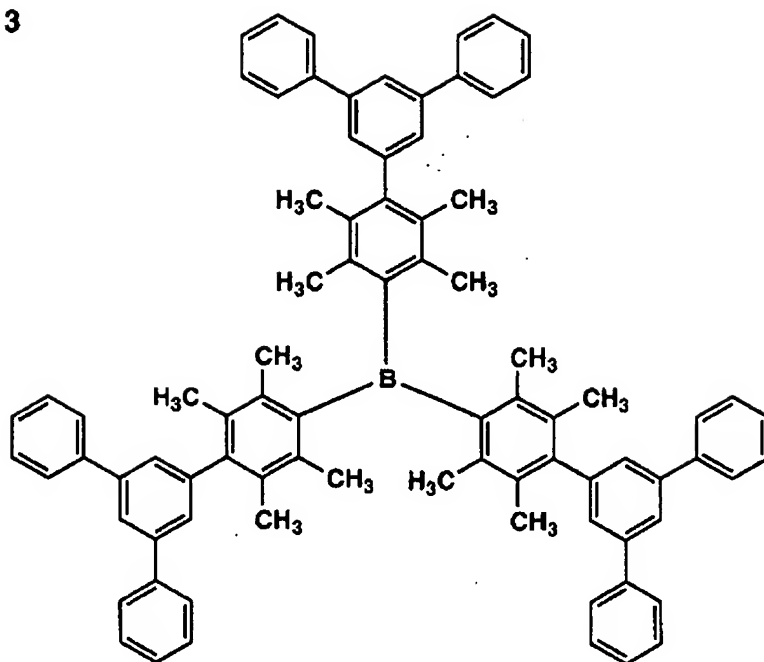


[0721]

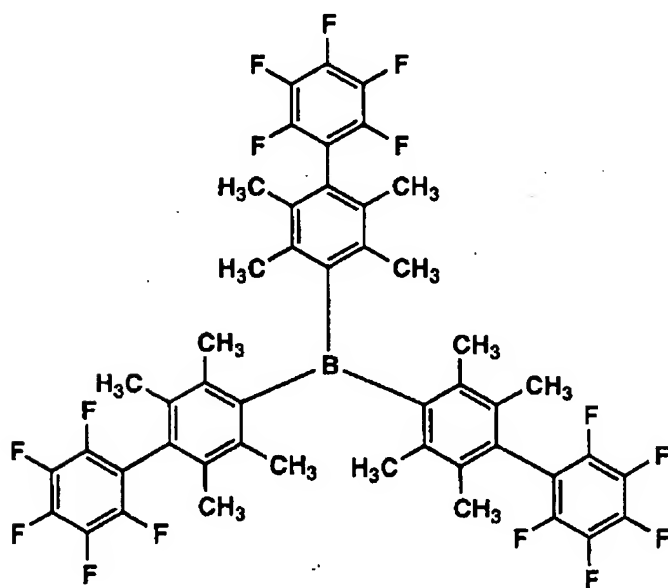
[Chemical formula 453]



3



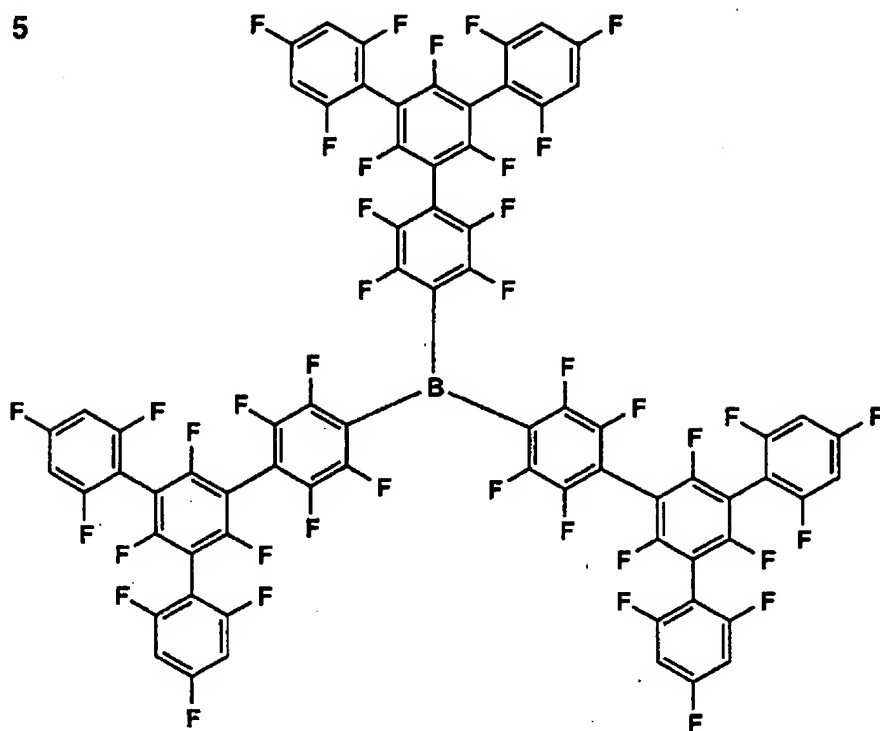
4



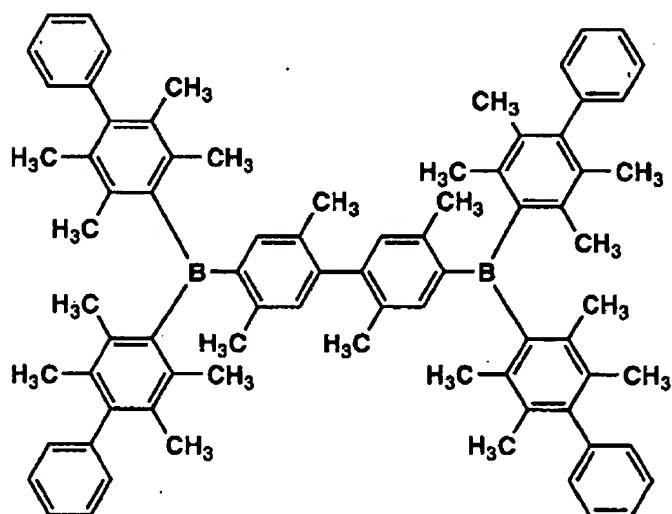
[0722]

[Chemical formula 454]

5

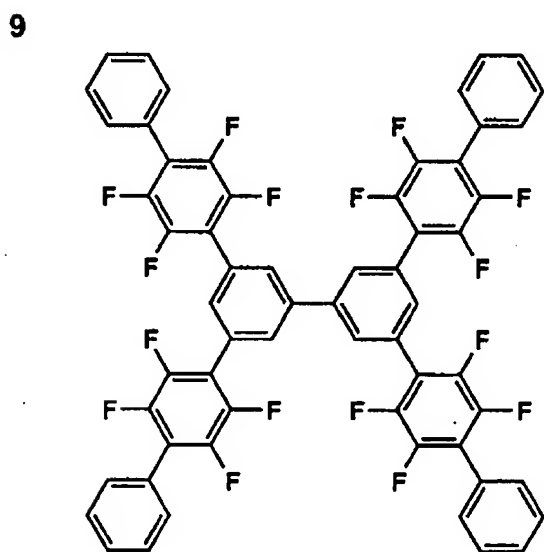
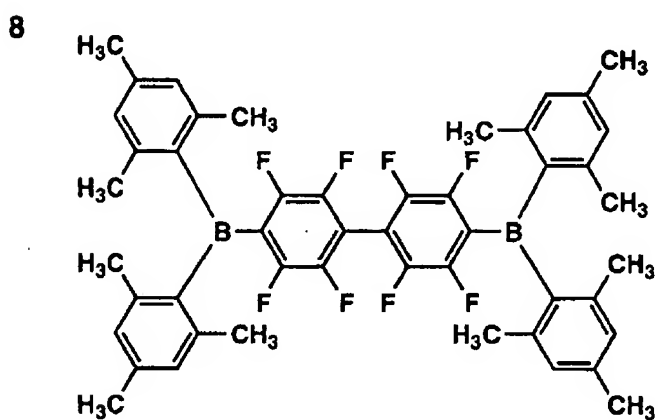
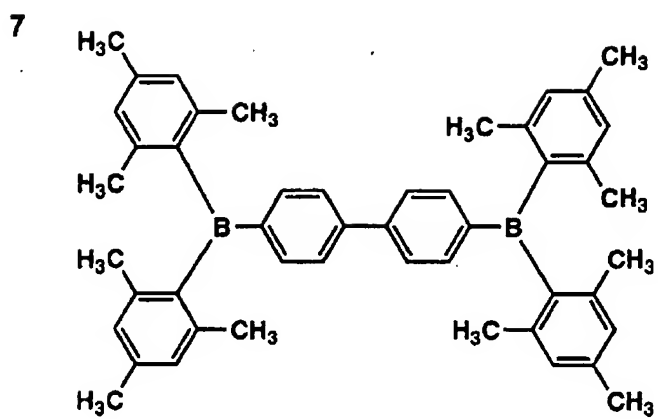


6



[0723]

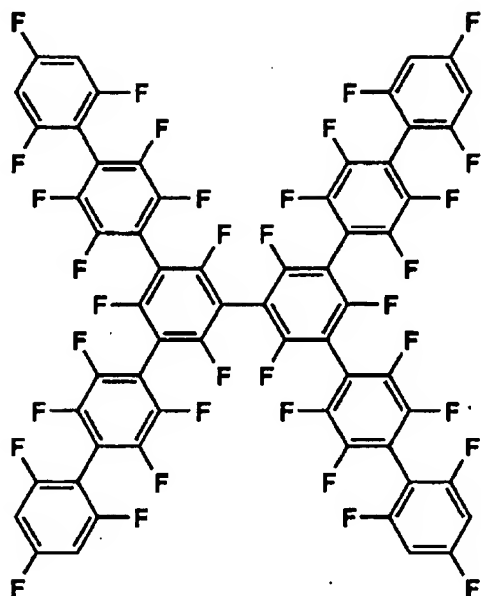
[Chemical formula 455]



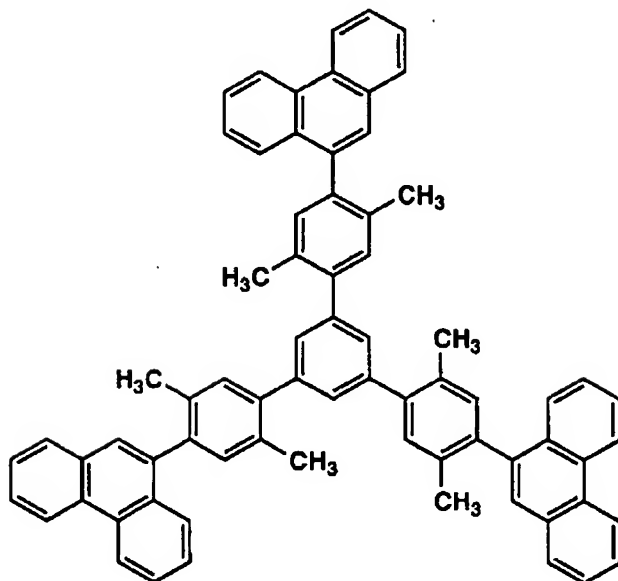
[0724]

[Chemical formula 456]

10



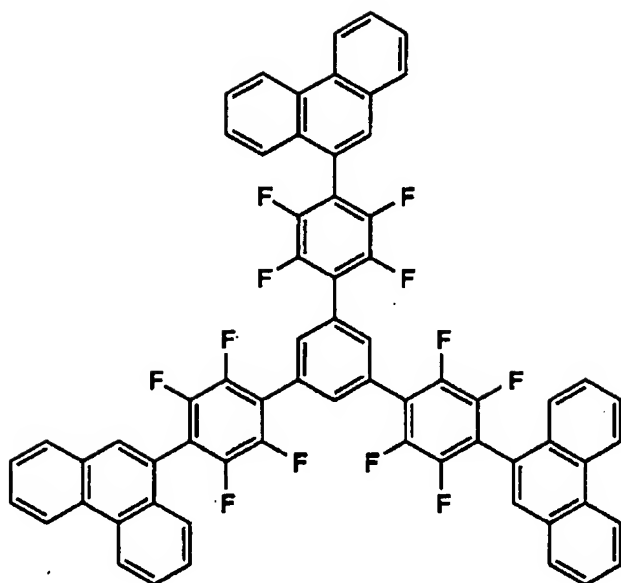
11



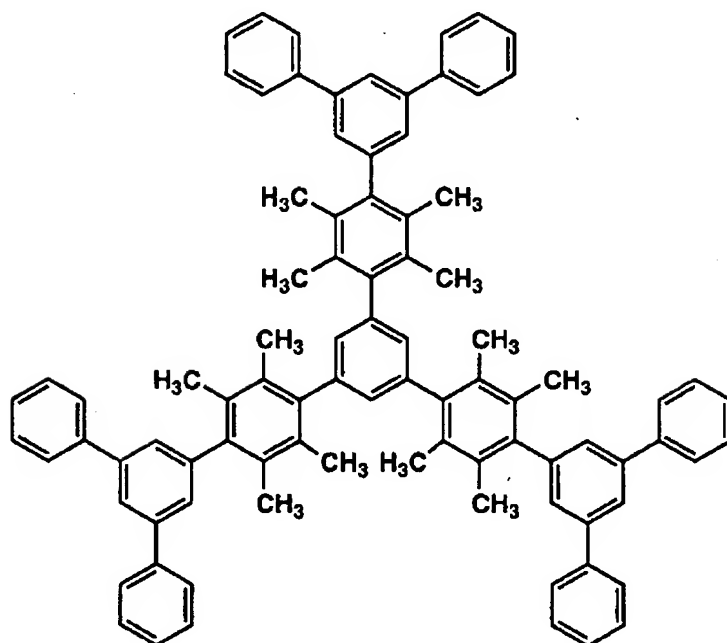
[0725]

[Chemical formula 457]

12



13

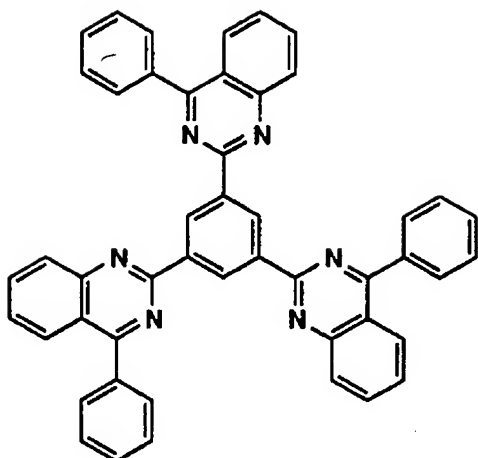


[0726]

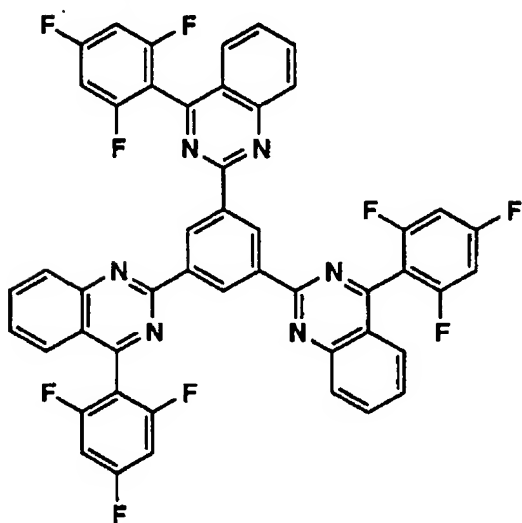
[Chemical formula 458]



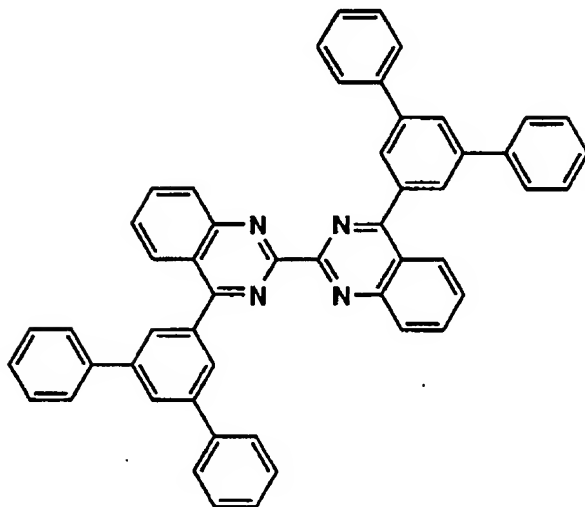
14



15



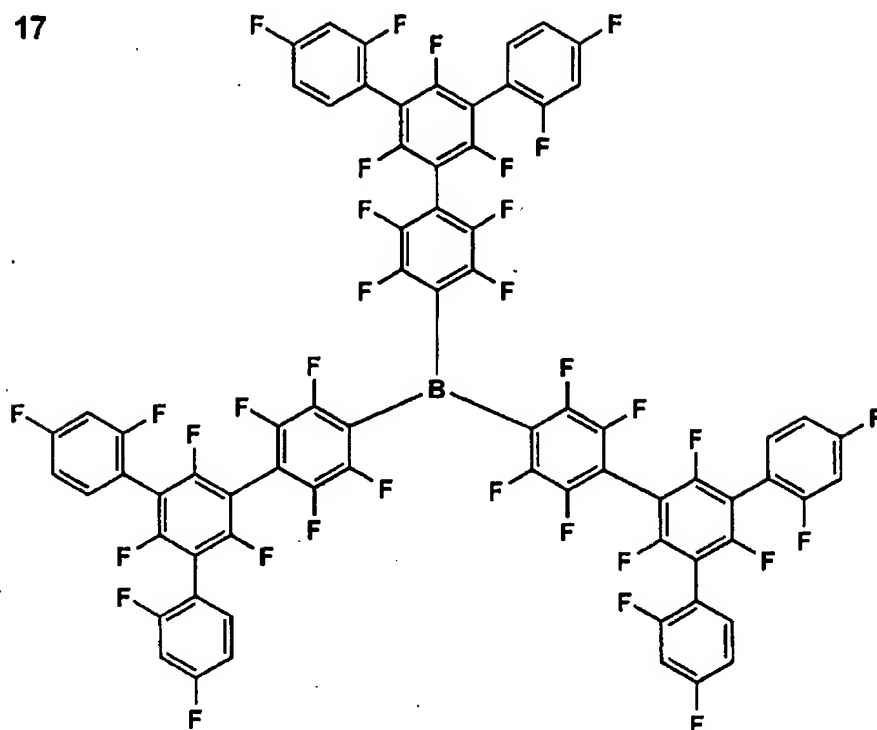
16



[0727]

[Chemical formula 459]

17



[0728]The compound (compound which comprises Si and a carbazole derivative) denoted by the general formula (C9-1) concerning this invention is explained.

[0729]R expresses hydrogen or a univalent substituent among the formula of a general formula (C9-1). As a univalent substituent, an aliphatic hydrocarbon machine, an aromatic series machine, and an aromatic series hetero ring machine are expressed, it is an aliphatic hydrocarbon machine preferably -- more -- desirable -- an alkyl group (a methyl group.) They are alkenyl groups (a vinyl group, a propenyl machine, a styryl machine, etc.), such as an ethyl group, i-propyl group, a hydroxyethyl machine, a methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, and a cyclohexyl group.

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Due to excessive amounts of data, whole translation was NOT completed.  
For subsequent translation(s), please click on the above "CONTINUE" button.  
When continued, the current translation will be overwritten with the new translation.

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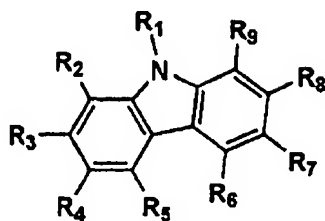
---

[0730]L is a connection machine, a condensed multi-ring machine, a complex monocycle machine, or a substitution phenyl group which expresses a divalent connection machine and is formed with carbon, silicon, nitrogen, boron, oxygen, sulfur, metal, a metal ion, etc. Preferably, are a carbon atom, a nitrogen atom, a silicon atom, a boron atom, an oxygen atom, a sulfur atom, a condensed multi-ring machine, a complex monocycle machine, or a substitution phenyl group, and still more preferably, an alkyl group (a methyl group, an ethyl group, i-propyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, Alkenyl groups, such as a cyclohexyl group (a vinyl group, a propenyl machine, a styryl machine, etc.), alkynyl groups (ethynyl group etc.) and an alkyloxy machine (a methoxy group and an ethoxy basis.) Aryloxy groups, such as i-propoxy group and a butoxy machine (phenoxy group etc.), An alkylthio group (a methylthio group, an ethyl thio group, i-pro PIRUKIO machine, etc.), arylthio groups (phenylthio group etc.), an amino group, and an alkylamino group (a dimethylamino group.) arylamino machines (an ANIRINO machine.), such as a diethylamino machine and an ethyl methylamino machine condensed multi-ring machines (a naphthyl group and an anthryl group.), such as a diphenylamino machine a phenan trill machine, a BENZOOKI Southall machine, a benzothia ZORU machine, a benzimidazole machine, and a complex monocycle machine (a frill machine, a thienyl group, a pyrrole group, a pyrimidyl machine, a pyrazine machine, a triazine machine, a pyrrolidyl machine, and a pyrazolyl machine.) They are substitution phenyl groups (a trill machine, a KISHIRIRU machine, a trimethyl phenyl machine, a tetramethyl phenyl group, a biphenyl machine, a terphenyl machine), such as an imidazolyl group, a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, and a benzoxazolyl machine.

[0731]A expresses the following carbazole derivative residue which has a substituent in the active site of a carbazole ring.

[0732]

[Chemical formula 460]



[0733]One in a formula and in  $R_1 - R_9$  is combined with L, the remaining  $R_1 - R_9$  express the substituent of a hydrogen atom or 1 value, and at least one of active site  $R_4$  of a carbazole ring or the  $R_7$  is replaced by the substituent of 1 values other than a phenyl group. [ as a substituent of the 1 value denoted by  $R_1 - R_8$  ] an alkyl group (a methyl group, an ethyl group, i-propyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, aryl groups (substitution phenyl group (a trill machine.)), such as a cyclohexyl group and a benzyl group A KISHIRIRU machine, a trimethyl phenyl machine, a tetramethyl phenyl group, a biphenyl machine, A terphenyl machine, a naphthyl group, p-trill machine, p-chlorophenyl machine, etc., Alkenyl groups (a vinyl group, a propenyl machine, a styryl machine, etc.), an alkynyl group (ethynyl group etc.), An alkyloxy machine (a methoxy group, an ethoxy basis, i-propoxy group, a butoxy machine, etc.), aryloxy groups (phenoxy group etc.) and an alkylthio group (a methylthio group.) Arylthio groups, such as an ethyl thio group and i-pro PIRUKIO machine (phenylthio group etc.), an amino group and an alkylamino group (a dimethylamino group and a diethylamino machine.) arylamino machines (an ANIRINO machine, a diphenylamino machine, etc.), such as an ethyl methylamino machine, halogen atoms (a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc.), a cyano group, a nitro group, and a heterocyclic machine (a pyrrole group, a pyrrolidyl machine, a pyrazolyl machine, and an imidazolyl group.) Silyl groups (a trimethylsilyl machine, t-butyldimethylsilyl group, a dimethylphenyl silyl group, a bird phenyl silyl group, etc.), such as a pyridyl group, a benzimidazolyl machine, a benzothiazolyl machine, and a benzoxazolyl machine, etc. are mentioned. Each substituent may have a substituent further. Substituents may join together and a ring may be formed.

[0734]As for the molecular weight of a compound denoted by the general formula (C9-1)

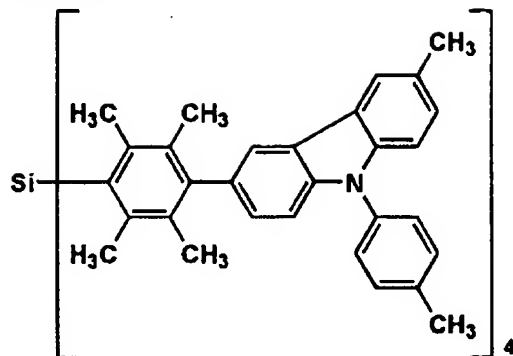
concerning this invention, it is preferred that it is the range of 350-3000. It is preferred to use the material which generally forms amorphous glass possible [ a vacuum evaporation method ] and uniform for producing a highly efficient organic EL device. Although it changes also with structures of a compound, a stable organic EL device is unproducible from it being easy to crystallize, since a molecular weight can produce only the organic EL device in which a glass transition point is low and lacking in heat resistance at less than 350 and the stability of a glass state is missing. On the other hand, when a molecular weight exceeds 3000, there is a tendency that film production by vacuum evaporation cannot be performed, and it becomes a problem when producing a highly efficient organic EL device.

[0735]Although the example of a concrete compound is shown below, the compound in this invention is not limited to these.

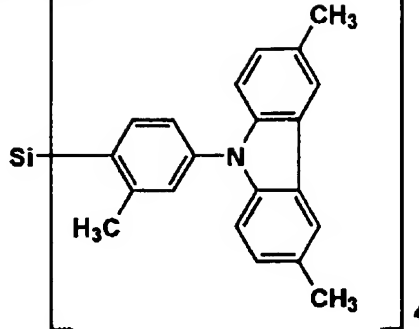
[0736]

[Chemical formula 461]

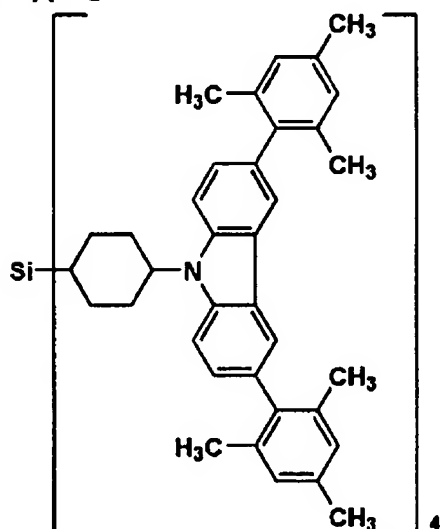
C9-A-1



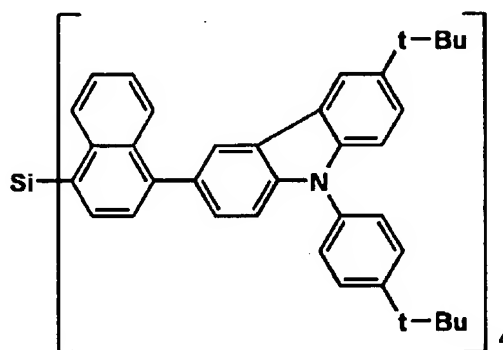
C9-A-2



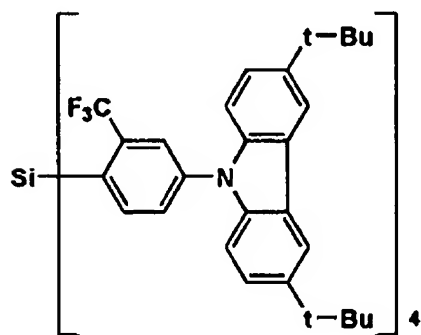
C9-A-3



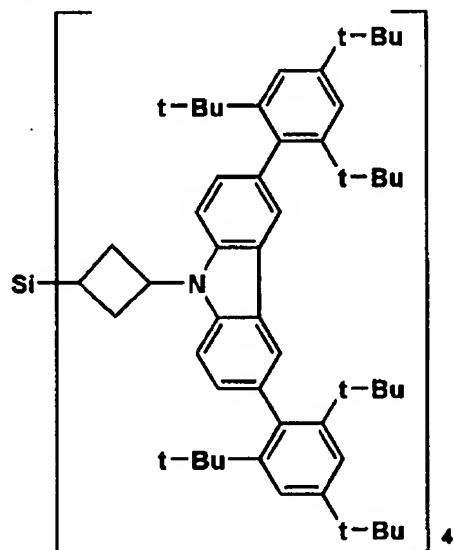
C9-A-4



C9-A-5



C9-A-6

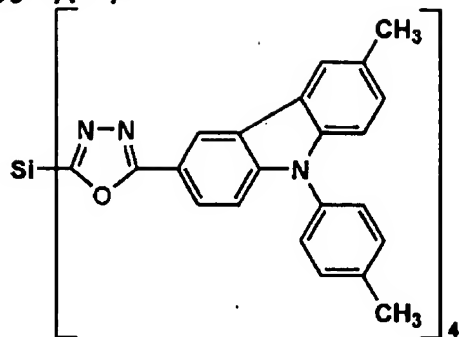




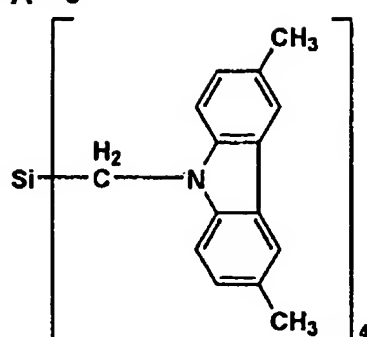
[0737]

[Chemical formula 462]

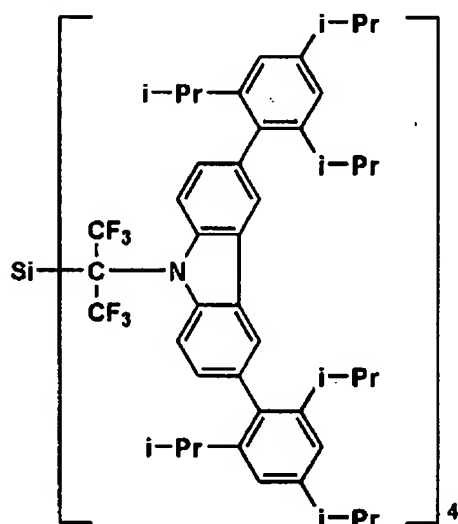
C9-A-7



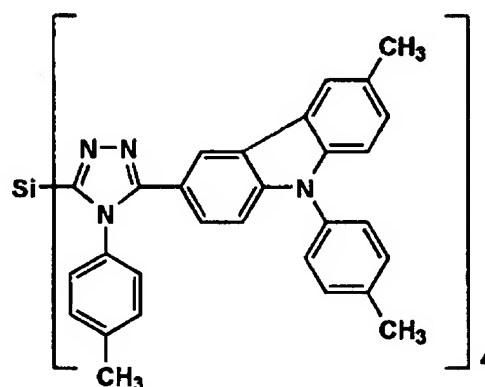
C9-A-8



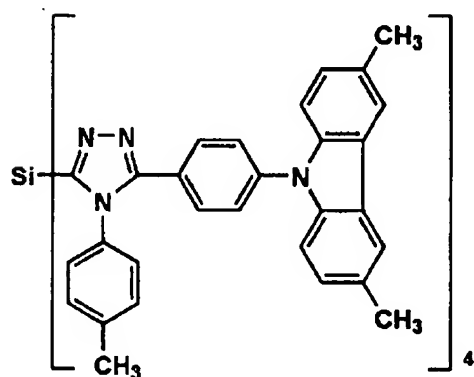
C9-A-9



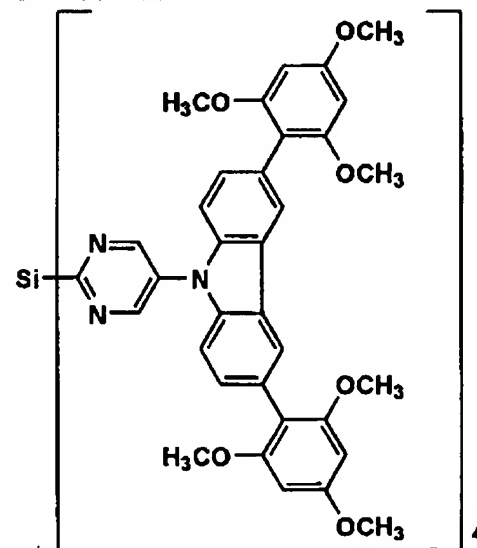
C9-A-10



C9-A-11



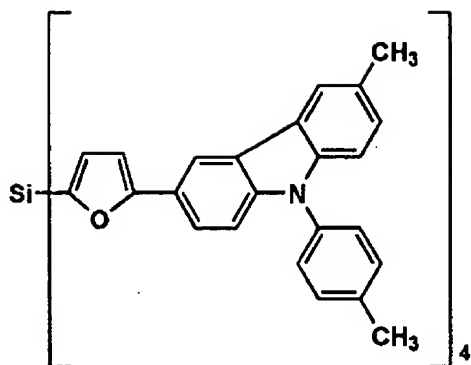
C9-A-12



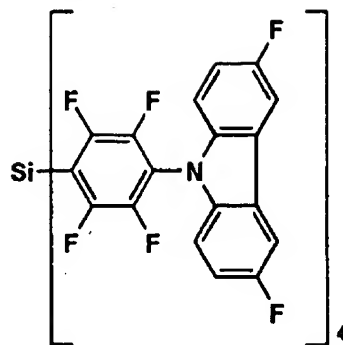
[0738]

[Chemical formula 463]

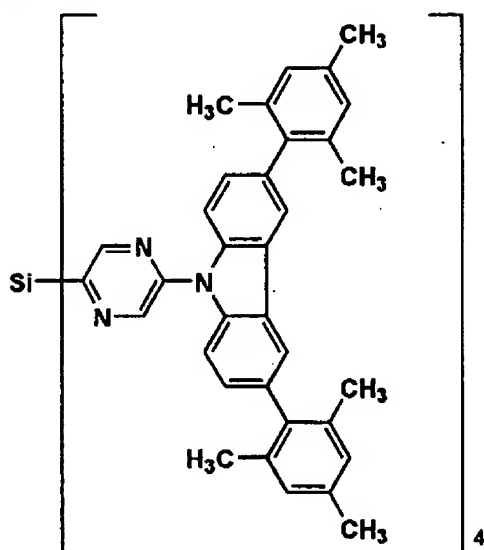
C9-A-13



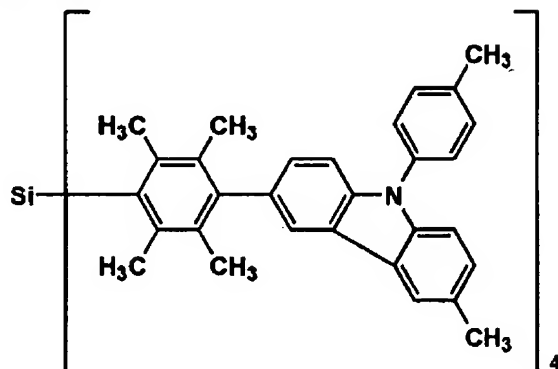
C9-A-14



C9-A-15



C9-A-16

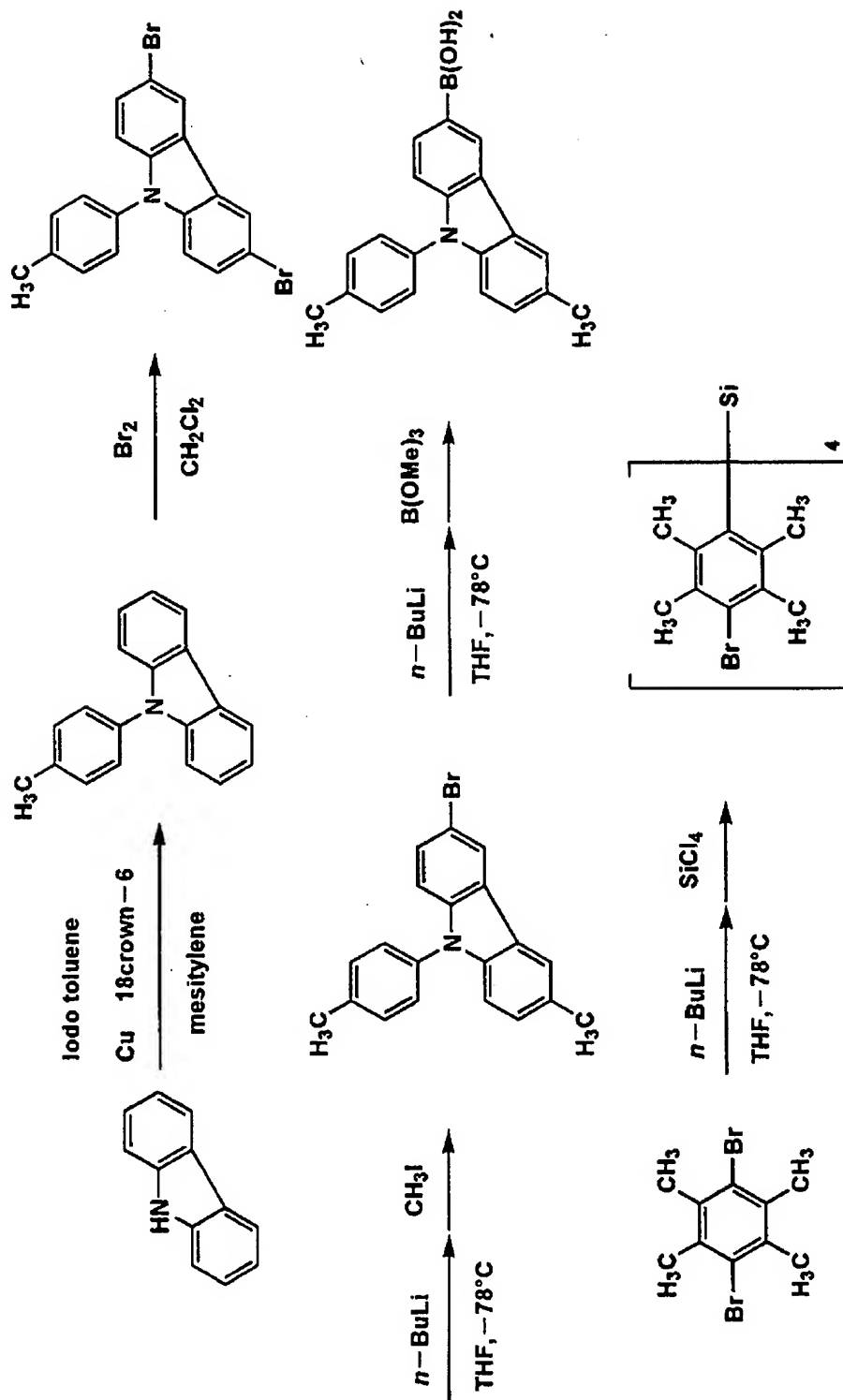


[0739]The compound concerning this invention denoted by a general formula (C9-1) can be

conventionally manufactured by a publicly known method. Although an example of a synthetic pathway is shown about compound C9-A-16 illustrated below, it is possible to manufacture with the other methods that a compound is also the same, following document, and publicly known synthetic methods.

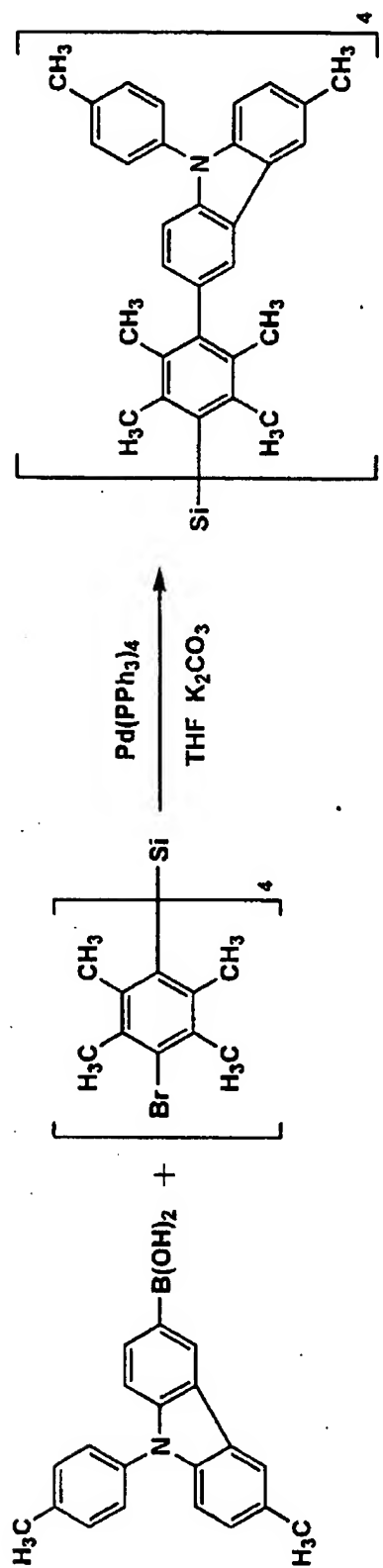
[0740]

[Chemical formula 464]



[0741]

[Chemical formula 465]





[0742]Buchanan. [ Tucker J.Chem.Soc., 1958, 2750Steinhoff Henry, J.Org.Chem., 29 and 1964, 2808Spialter et al, J.Amer.Chem.Soc. 77 and 1955, and 6227 each compound ] It can identify with NMR (nuclear magnetic resonance spectrum) and a mass spectrum.

[0743]The compound denoted by a general formula (C10-1) is explained.

[0744]Although the organic electroluminescence element of this invention contains at least one compound expressed with said general formula (C10-1) to at least one layer which constitutes this element, it is that the desirable above-mentioned compound contains in a luminous layer.

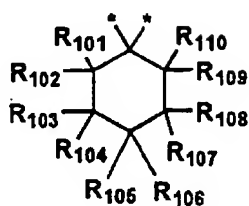
[0745]The connection machine is introduced into the beer reel part of the middle of the molecule of a carbazole derivative in JP,2000-21572,A and a 2002-8860 gazette. When it was considered as the molecular structure which omitted the aryl group which left the specific connection machine here and has connected the connection machine of each other with it from the compound of the description, it turned out that the characteristic as an organic EL device material may be improved remarkably.

[0746]These connection machines are annular connection machines of a non-aromatic system. Specifically, it is a basis given in following general formula (a) - (g).

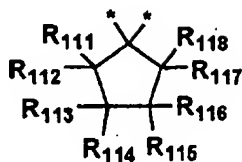
[0747]

[Chemical formula 466]

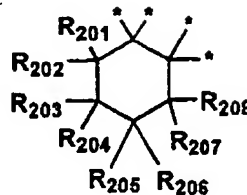
一般式(a)



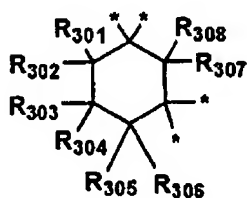
一般式(b)



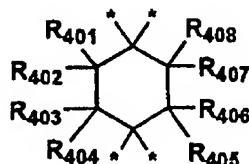
一般式(c)



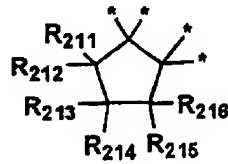
一般式(d)



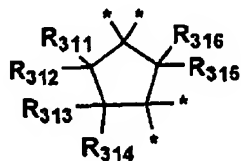
一般式(e)



一般式(f)



一般式(g)



[0748]  $R_{101}$ - $R_{110}$ ,  $R_{111}$ - $R_{118}$ ,  $R_{201}$ - $R_{208}$ ,  $R_{301}$ - $R_{308}$ ,  $R_{401}$ - $R_{408}$ ,  $R_{211}$ - $R_{216}$ ,  $R_{311}$ - $R_{316}$  express a hydrogen atom or a substituent among a formula, respectively. \* Express a connection part.

[0749] As a result of evaluating such a carbazole derivative as an organic EL device material, luminous efficiency and the improvement effect of the luminescence life were seen. By making a carbazolyl machine connect with the annular connection machine of a non-aromatic system, the characteristic of a compound has been improved and the stabilization effect has guessed that this becomes large.

[0750]In the general formula (C10-1),  $-A_1$  is denoted by a general formula (C10-2), may be the same or may differ. Among a formula,  $X_1$  is an annular connection machine of a non-aromatic system, and expresses the basis preferably denoted by general formula (a) - (g). General formula (a) In - (g), \* expresses the part to connect. n is an integer of 1-4 and n is an integer of 2-4 preferably. However, when  $X_1$  expresses the basis denoted by general formula (a) - (g), n is 2 or 4.

[0751]In a general formula (C10-2),  $R_1$  and  $R_2$  express a hydrogen atom or a substituent respectively independently. When  $R_1$  and  $R_2$  express a substituent, [ as the substituent ] an alkyl group (for example, a methyl group, an ethyl group, an isopropyl group, and a hydroxyethyl machine.) Cycloalkyl machines, such as a methoxymethyl machine, a trifluoromethyl group, and t-butyl group. (For example, a cyclopentyl group, a cyclohexyl group, etc.), and aralkyl groups. (For example, a benzyl group, 2-FENECHIRU machine, etc.), and aryl groups. for example, a phenyl group, a naphthyl group, p-trill machine, and p-chlorophenyl machine. alkoxy groups (for example, an ethoxy basis and an isopropoxy group.), such as a MESHICHIRU machine Aryloxy groups (for example, phenoxy group etc.), a cyano group, a hydroxyl group, alkenyl groups (for example, vinyl group etc.) and styryl machines, such as a butoxy machine, halogen atoms (for example, fluorine atom etc.), heterocyclic machines (for example, a pyrrolyl machine, a pyridyl group, a frill machine, a thienyl group, etc.), etc. are mentioned. These bases may be replaced further. When  $R_1$  and  $R_2$  express a substituent, they are an alkyl group, an alkoxy group, or an aryl group preferably.

[0752] $n_a$  and  $n_b$  are the integers of 0-4.

[0753]General formula (a) which is a connection machine - (g) is explained.

[0754] $R_{101}-R_{110}$ ,  $R_{111}-R_{118}$ ,  $R_{201}-R_{208}$ ,  $R_{301}-R_{308}$ ,  $R_{401}-R_{408}$ ,  $R_{211}-R_{216}$ ,  $R_{311}-R_{316}$  express a hydrogen atom or a substituent, respectively.  $R_{101}-R_{110}$ ,  $R_{111}-R_{118}$ ,  $R_{201}-R_{208}$ , When  $R_{301}-R_{308}$ ,  $R_{401}-R_{408}$ ,  $R_{211}-R_{216}$ ,  $R_{311}-R_{316}$  express a substituent, the substituent is synonymous with the substituent described by  $R_1$  and  $R_2$ . Alkyl groups (for example, a methyl

group, an ethyl group, an isopropyl group, etc.), alkoxy groups (for example, a methoxy group, an ethoxy basis, etc.), etc. are mentioned preferably.

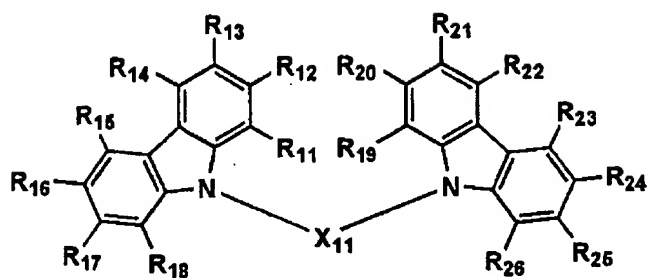
[0755]General formula (a) It is (a) preferably in - (g).

[0756]These compounds of each other may be many quantified in the arbitrary portions of a carbazoyl machine. When it many quantifies, the connection machine of arbitrary 2 values may be passed and it may join together directly. Since the heat stability of a molecule improves by many quantifying, the further contribution is obtained by improvement in the element characteristic. As a connection machine of 2 values, it is the Ally Wren machine which is not replaced [ substitution or ] preferably.

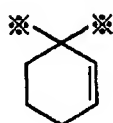
[0757]Although the example of the compound of this invention is shown below, it is not limited to these. When a carbazoyl machine is [ the annular connection machine of a non-aromatic system ]  $X_{11}$  in two pieces, the structure and the example of  $X_{11}$  are shown below. A concrete carbazoyl machine is denoted by combination of  $R_{12}$  of a carbazoyl machine portion - an  $R_{26}$  machine like C-1 to C-8. Therefore, the examples of the compound of this invention are all the combination of C-1 to C-8, and A-1 to A-15, and the illustration compound of this invention is expressed like illustration (C-1) (A-3).

[0758]

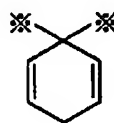
[Chemical formula 467]

 $X_{11}$ :

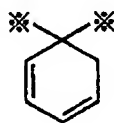
A-1



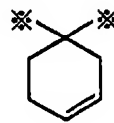
A-2



A-3



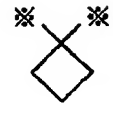
A-4



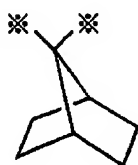
A-5



A-6



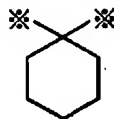
A-7



A-8



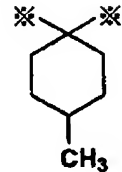
A-9



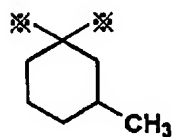
A-10



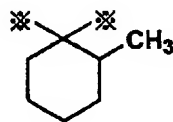
A-11



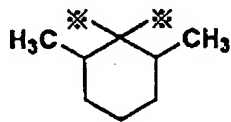
A-12



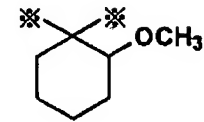
A-13



A-14



A-15



※は連結部位を表す。

[0759]

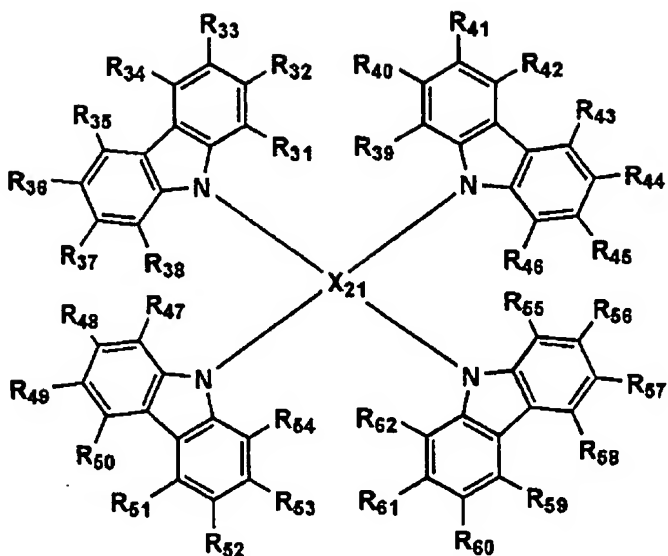
[Chemical formula 468]

	R <sub>12</sub> , R <sub>14</sub> , R <sub>15</sub> , R <sub>17</sub> , R <sub>20</sub> , R <sub>22</sub> , R <sub>23</sub> , R <sub>25</sub> の基	R <sub>13</sub> , R <sub>16</sub> , R <sub>21</sub> , R <sub>24</sub> の基	R <sub>11</sub> , R <sub>18</sub> , R <sub>19</sub> , R <sub>26</sub> の基
C-1	水素原子	水素原子	水素原子
C-2	水素原子	水素原子	メチル基
C-3	水素原子	メチル基	水素原子
C-4	水素原子	t-ブチル基	水素原子
C-5	水素原子	フェニル基	水素原子
C-6	水素原子	メシチル基	水素原子
C-7	水素原子	R <sub>13</sub> , R <sub>16</sub> : メチル基、 R <sub>21</sub> , R <sub>24</sub> : 水素原子	水素原子
C-8	水素原子	R <sub>13</sub> , R <sub>16</sub> : メシチル基 R <sub>21</sub> , R <sub>24</sub> : 水素原子	水素原子

[0760]When a carbazolyl machine is [ the annular connection machine of a non-aromatic system ]  $X_{21}$  in four pieces, the structure and the example of  $X_{21}$  are shown below. A concrete carbazolyl machine is denoted by combination of  $R_{31}$  of a carbazolyl machine portion - an  $R_{62}$  machine like D-1 to D-9. Therefore, the examples of the compound of this invention are all the combination of D-1 to D-9, and B-1 to B-7, and the illustration compound of this invention is expressed like illustration (D-2) (B-5).

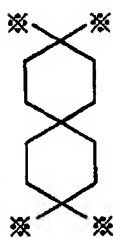
[0761]

[Chemical formula 469]

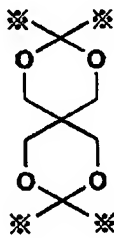


$X_{21}$ :

**B-1**



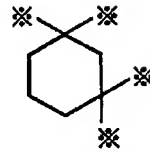
**B-2**



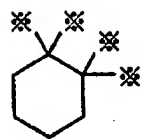
**B-3**



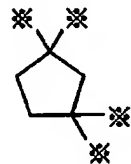
**B-4**



**B-5**



**B-6**



**B-7**



※は連結部位を表す。

[0762]

[Chemical formula 470]



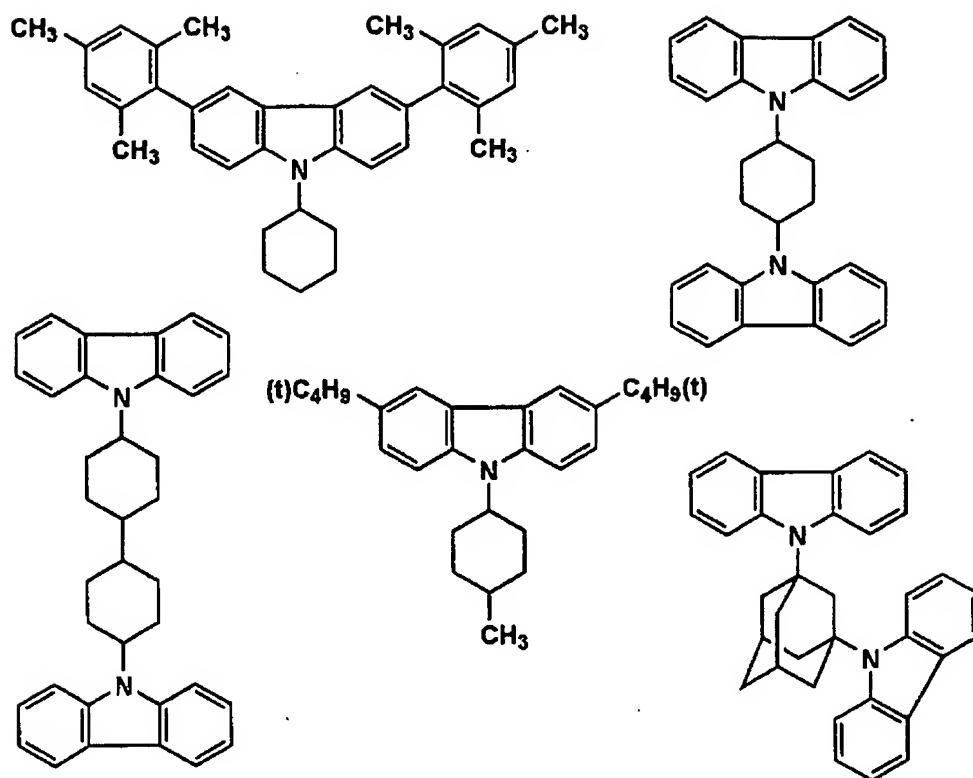
	R32, R34, R35, R37, R40, R42, R43, R45, R48, R50, R51, R53, R56, R58, R59, R61の基	R33, R36, R41, R44, R49, R52, R57, R60の基	R31, R38, R39, R46, R47, R54, R55, R62の基
D-1	水素原子	水素原子	水素原子
D-2	水素原子	水素原子	メチル基
D-3	水素原子	メチル基	水素原子
D-4	水素原子	ｾｰﾌﾞﾁﾙ基	水素原子
D-5	水素原子	ﾌｴﾆﾙ基	水素原子
D-6	水素原子	ﾒｼﾁﾙ基	水素原子
D-7	水素原子	R33, R36, R57, R60 : メチル基、 R41, R44, R49, R52 : 水素原子	水素原子
D-8	水素原子	R33, R36, R57, R60 : メｼﾁﾙ基 R41, R44, R49, R52 : 水素原子	水素原子
D-9	水素原子	水素原子	R31, R38, R55, R62 : メチﾙ基、 R39, R46, R47, R54 : 水素原子

[0763]The following is mentioned as a concrete compound of this invention which is not

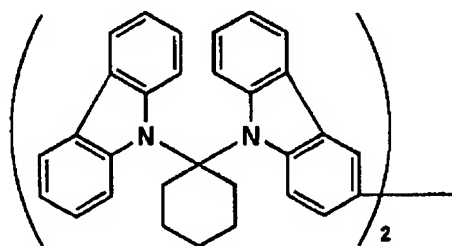
expressed in the above-mentioned combination.

[0764]

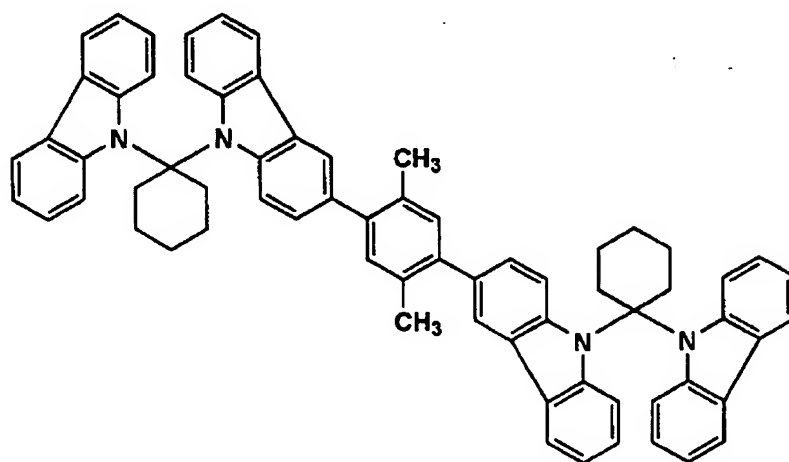
[Chemical formula 471]



例示1



例示2



[0765]The example of typical manufacture of the compound of this invention is shown below. It can manufacture by a method with the same said of other compounds.

[0766]A synthetic example: The composition 1 of illustration (C-1) (A-9), the 1'-dibromo cyclohexane 2.0g, 2.8g of carbazole, and 1.9 g of potassium t-butoxide were dissolved in JIMECHIRU formamide, and heating flowing back was carried out for 9 hours. The organic layer was extracted after the end of a reaction, and column refining was performed. The compound after refining was re-crystallized with ethyl acetate, and white illustration (C-1) (A-9) was obtained (52% of \*\*\*\*). It checked that it was illustration (C-1) (A-9) with the NMR spectrum and the mass spectrum.

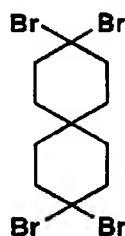
[0767]A synthetic example: The synthetic compound (B) and carbazole of illustration (D-1) (B-1) were made to react by the same method as the synthetic example 1, and illustration (D-1) (B-1) was obtained. It checked that it was illustration (D-1) (B-1) with the NMR spectrum and the mass spectrum.

[0768]A synthetic example: 1 and 1'-dibromo cyclohexane was made to react to synthetic 3-bromo carbazole of the illustration 1, and carbazole by the same method as the synthetic example 1, and the compound (C) was obtained. By the publicly known method, the compound (C) was conventionally changed into the boron acid (compound D). Heating flowing back of a compound (C) and the compound (D) was carried out under existence of a base among the tetrahydro franc for 20 hours using the palladium catalyst. The organic layer was extracted after the end of a reaction, and column refining was performed. If the compound after refining is re-crystallized with toluene, the white illustration 1 can be obtained.

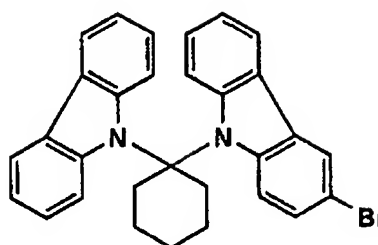
[0769]

[Chemical formula 472]

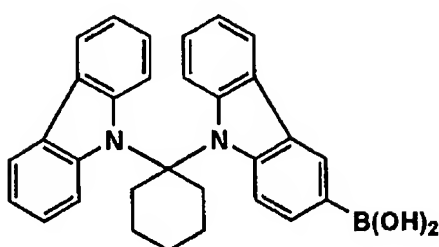
化合物(B)



化合物(C)



化合物(D)



[0770]The carbazole derivative compound denoted by a general formula (C11-1) is explained in detail.

[0771]A in a general formula (C11-1) expresses an aromatic ring residue, and benzene, pyridine, PIRIDAJIN, pyrimidine, pyrazine, 1,3,5-triazine, 1,2,4-triazine, pyrrole, imidazole, a franc, CHIOFEN, AZUREN, etc. are mentioned as the example. Although it may be a condensation aromatic ring residue by the arbitrary combination of these aromatic ring residues and NAFUTAREN, anthracene, JICHIENO benzene, carbazole, quinoline, etc. can be mentioned as an example of such a condensation aromatic ring residue, It is more desirable to be an aromatic ring residue of the monocycle type which has not been condensed. These aromatic ring residues may have a substituent and as an example of a substituent An alkyl group. for example, a methyl group, an ethyl group, a propyl group, an isopropyl group, and the (t) butyl group. A pentyl group, a hexyl group, an octyl group, a dodecyl group, a tridecyl machine, Cycloalkyl machines, such as a tetradecyl machine and a pentadecyl group. (For example, a cyclopentyl group, a cyclohexyl group, etc.), and alkenyl groups. (For example, a

vinyl group, an allyl group, etc.), and alkynyl groups (for example, propargyl machine etc.), Aryl groups (for example, a phenyl group, a naphthyl group, etc.), a heterocyclic machine. for example, a pyridyl group, a thiazolyl machine, an oxazolyl machine, and an imidazolyl group. A frill machine, a pyrrolyl machine, a pyrazinyl machine, a pyrimidinyl group, a PIRIDAJINIRU machine, A selenazolyl machine, the Sour Hora Nils machine, a piperidinyl machine, a pyrazolyl machine, halogen atoms (for example, a chlorine atom and a bromine atom.), such as a tetrazolyl group alkoxyl groups (for example, a methoxy group.), such as an iodine atom and a fluorine atom Cyclo alkoxyl groups (for example, a cyclopenthyloxy machine, a cyclohexyloxy machine, etc.), such as an ethoxy basis, a propyloxy machine, a pentyloxy machine, a hexyloxy machine, an octyloxy machine, and a dodecyloxy machine, an aryloxy group (for example) alkylthio groups (for example, a methylthio group.), such as a phenoxy group and a naphthyloxy machine An ethyl thio group, a propyl thio group, a pentyl thio group, a hexyl thio group, Cyclo alkylthio groups, such as an octylthio machine and a DODESHIRUCHIO machine. (For example, a cyclopentyl thio group, a cyclohexyl thio group, etc.), and arylthio groups. (For example, a phenylthio group, the Naff Chill thio group, etc.), and alkoxycarbonyl groups. for example, a methyloxy carbonyl group and an ethyloxy carbonyl group. A butyloxy carbonyl group, an octyloxy carbonyl group, a dodecyloxy carbonyl group, etc., an aryloxy carbonyl group (for example, a phenyloxy carbonyl group.) sulfamoyl groups (for example, an amino sulfonyl group.), such as a naphthyloxy carbonyl group A methylamino sulfonyl group, a dimethylamino sulfonyl group, a butylamino sulfonyl group, A hexylamino sulfonyl group, a cyclohexylamino sulfonyl group, UREIDO machines (for example, a MECHIRUU RAID machine, an ECHIRUU RAID machine, and a pentyl RAID machine.), such as an octyl amino sulfonyl group, a dodecylamino sulfonyl group, a phenylamino sulfonyl group, a NAFUCHIRU amino sulfonyl group, and 2-pyridylamino sulfonyl group A cyclohexyl RAID machine, an octyl RAID machine, a DODESHIRUU RAID machine, A phenyl RAID machine, a NAFUCHIRUU RAID machine, 2-pyridylamino RAID machine, etc., an acyl group (for example, an acetyl group, an ethyl carbonyl group, and a propylcarbonyl machine.) A pentyl carbonyl group, a cyclohexyl carbonyl group, an octyl carbonyl group, A 2-ethylhexyl carbonyl group, a DODESHIRU carbonyl group, a phenylcarbonyl machine, Reed RUOKISHI machines, such as the Naff Chill carbonyl group and a pyridyl carbonyl group. for example, an acetyloxy machine, ethyl carbonyloxy group, and butyl carbonyloxy group. Octyl carbonyloxy group, DODESHIRU carbonyloxy group, phenyl carbonyloxy group, etc., an amide machine (for example, a methyl carbonylamino machine and an ethyl carbonylamino machine.) A JIMECHIRU carbonylamino machine, a propyl carbonylamino machine, a pentyl carbonylamino machine, carbamoyl groups (for example, an aminocarbonyl group.), such as a cyclohexyl carbonylamino machine, a 2-ethylhexyl carbonylamino machine, an octyl carbonylamino machine, a DODESHIRU carbonylamino machine, a phenyl carbonylamino

machine, and a NAFUCHIRU carbonylamino machine A methylamino carbonyl group, a dimethylamino carbonyl group, a propylamino carbonyl group, A pentylamino carbonyl group, a cyclohexyl aminocarbonyl group, An octyl aminocarbonyl group, a 2-ethylhexyl aminocarbonyl group, A dodecylamino carbonyl group, a phenylaminocarbonyl machine, the Naff Chill aminocarbonyl group, sulfinyl groups (for example, a methylsulfinyl machine.), such as 2-pyridylamino carbonyl group An ethyl sulfinyl group, a butyl sulfinyl group, a cyclohexyl sulfinyl group, A 2-ethylhexyl sulfinyl group, a DODESHIRU sulfinyl group, a phenyl sulfinyl group, ARUKIRU sulfonyl groups, such as the Naff Chill sulfinyl group and 2-pyridyl sulfinyl group, or an ARIRU sulfonyl group. for example, a methylsulfonyl machine, an ethyl sulfonyl group, and a butyl sulfonyl group. A cyclohexyl sulfonyl group, a 2-ethylhexyl sulfonyl group, a DODESHIRU sulfonyl group, amino groups (for example, an amino group, an ethylamino machine, a dimethylamino group, a butylamino machine, a cyclopentylamino machine, and a 2-ethylhexyl amino group.), such as a phenyl slufonyl machine, the Naff Chill sulfonyl group, and 2-pyridyl sulfonyl group A nitro group, a cyano group and hydroxyl machines, such as a dodecylamino machine, an ANIRINO machine, the Naff Chill amino group, and 2-pyridylamino machine, a halogen atom, etc. are mentioned. These bases may be replaced by the further above-mentioned substituent, and they may condense them mutually, and they may form a ring further.

[0772]In a general formula (C11-1), each of  $R_1 - R_8$  expresses a hydrogen atom or a substituent, and these are not hydrogen atoms simultaneously, namely, it is the carbazole derivative residue which is combined with A of the general formula 1. Although it is the same as that of the example of the substituent which can be combined with A of said general formula (C11-1) as an example of a substituent, About  $R_2 - R_7$ , it is preferred that they are a hydrogen atom, a fatty series machine, a fatty series OKISHI machine, a fatty series thio group, an aromatic series machine, an aromatic series OKISHI machine, and an aromatic series thio group, and also the case of  $R_2, R_3, R_6$ , and  $R_7$  where it has a substituent in either at least is more preferred. It is preferred that it is fluoridation a hydrogen atom, a halogen atom, or an alkyl group as  $R_1$  and  $R_8$ .

[0773]In the general formula 1, n expresses a natural number, when n is two or more, two or more carbazole derivative residues will combine with the aromatic ring frame denoted by A, but in this case, two or more carbazole derivative residues may be the same, or may differ.

[0774]Although it is also possible to use for any of the electron hole transportation layer of the organic EL device mentioned later, an electron transport layer, and a luminous layer, [ the compound concerning this invention ] . Preferably, especially, in a luminous layer, move energy to a phosphorescence luminescence compound preferably, and self does not emit [ an electron transport layer or a luminous layer and ] light. When it uses as a material known as a "host compound" by the engineer engaged in this business, it excels in quantum efficiency and luminescence luminosity, and the organic EL device in which performance high about especially endurance is shown can be produced. Although it is not clear about the Reason or movement mechanism which can show the characteristic outstanding to material with a publicly known compound concerning this invention, The carbazole residue which does not have a substituent At the time of the operation as an organic EL device, or preservation. in an excitation state probably in order for electric / thermal energy to decompose at the time especially of operation -- good, or in order to produce a \*\*\*\*\* chemical reaction and to decompose, it is surmised whether to have spoiled the stability as a material. By having a substituent, the compound concerning this invention can reduce such instability, and, thereby, is considered to be a suitable thing for production of a durable high organic EL device.

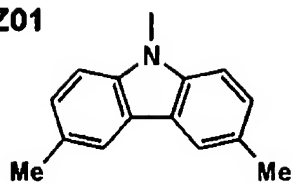
[0775]The example of the carbazole derivative residue which makes the partial structure of the compound concerning this invention as Z01-Z24 was shown below, and the example of the compound concerning this invention which makes these partial structure was shown as C11-1 - C11-63. However, the mode of this invention is not limited by the structure of these Z01-Z24 and C11-1 - C11-63.

[0776]

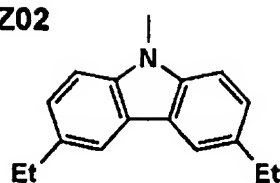


[Chemical formula 473]

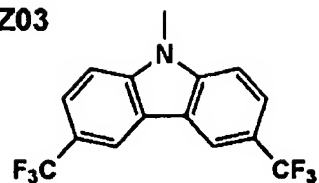
Z01



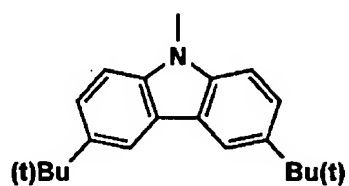
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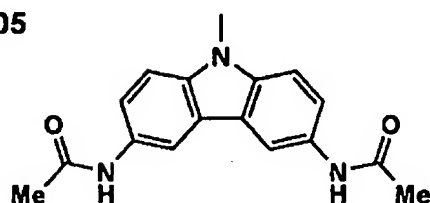
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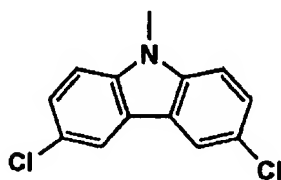
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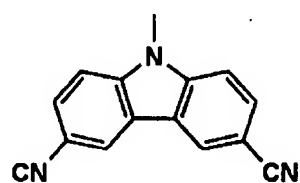
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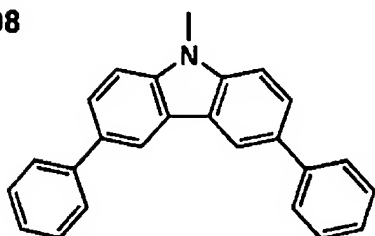
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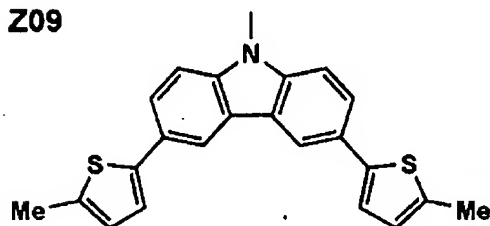
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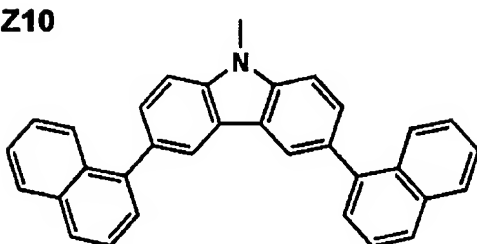
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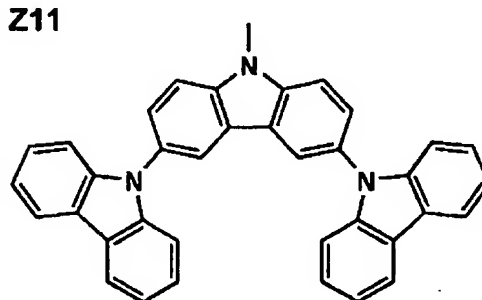
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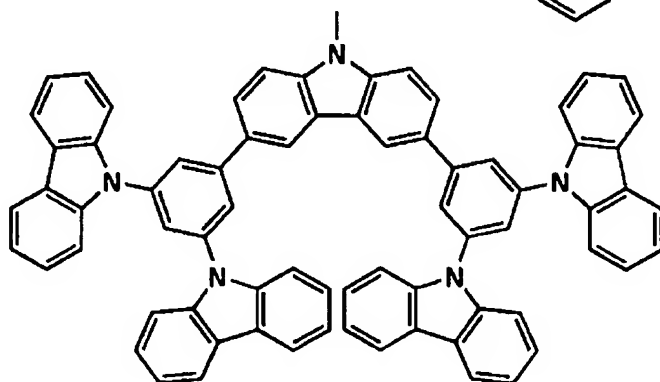
Z10



Z11



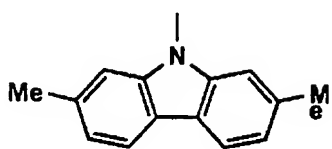
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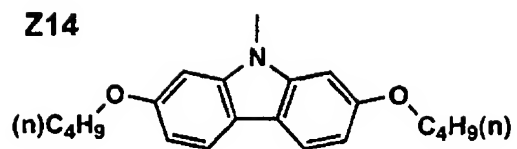
[0777]

[Chemical formula 474]

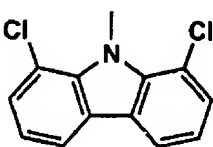
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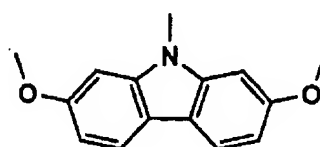
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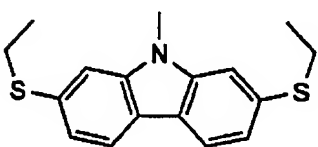
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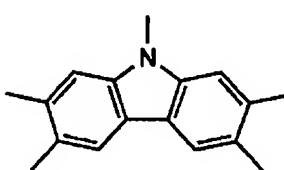
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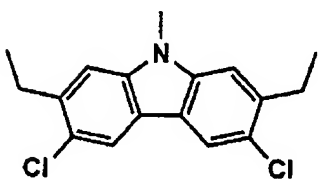
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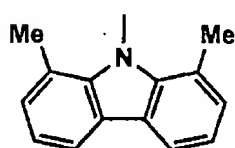
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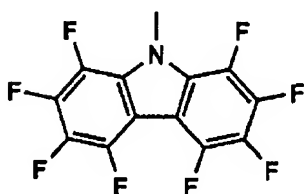
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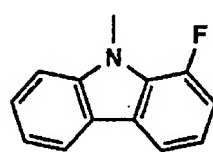
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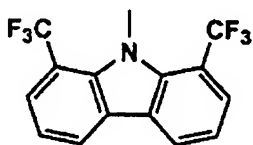
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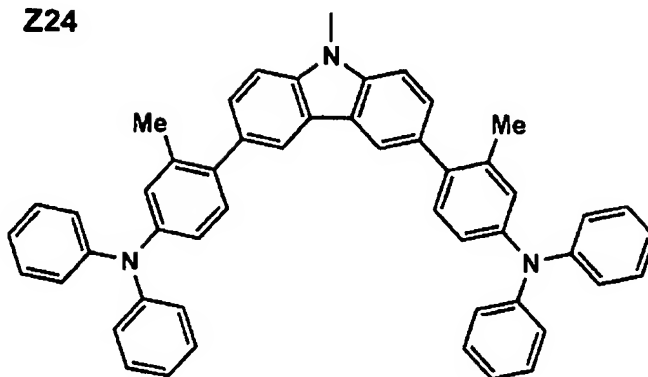
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Z23

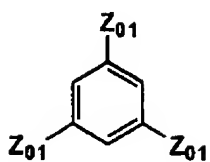
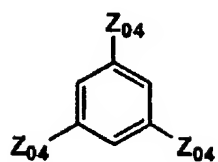
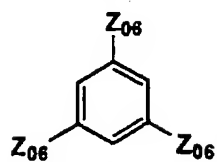
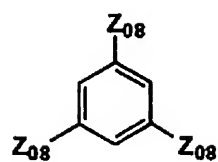
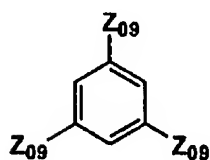
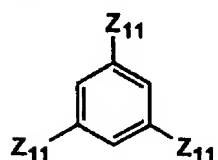
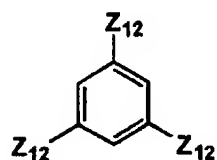
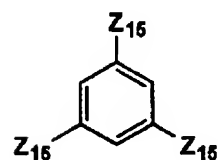
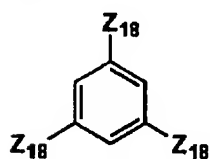
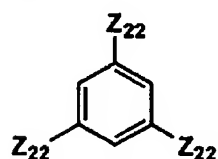
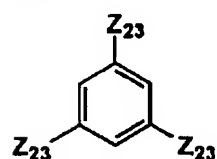
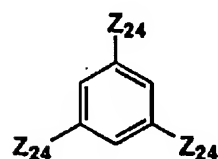
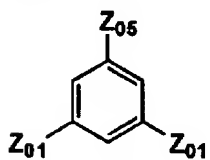
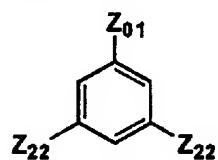
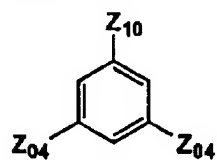
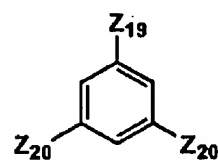
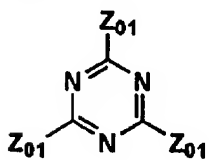
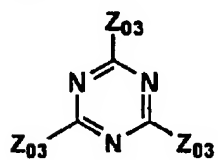
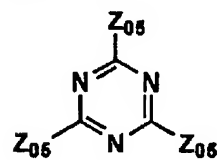
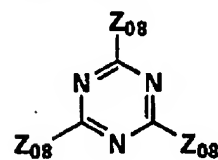
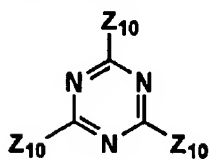
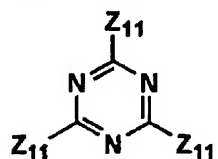
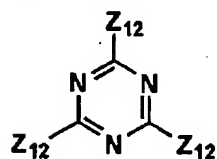
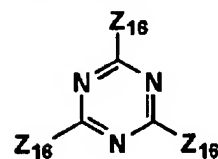
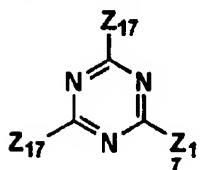
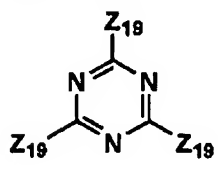
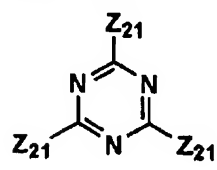
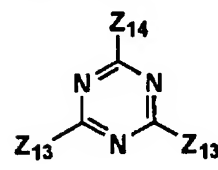


Z24



[0778]

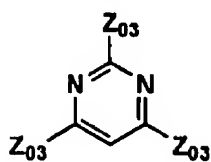
[Chemical formula 475]

**C11-1****C11-2****C11-3****C11-4****C11-5****C11-6****C11-7****C11-8****C11-9****C11-10****C11-11****C11-12****C11-13****C11-14****C11-15****C11-16****C11-17****C11-18****C11-19****C11-20****C11-21****C11-22****C11-23****C11-24****C11-25****C11-26****C11-27****C11-28**

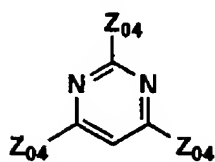
[0779]

[Chemical formula 476]

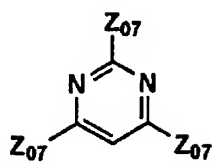
C11-29



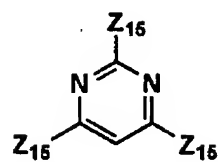
C11-30



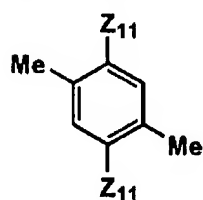
C11-31



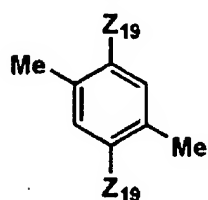
C11-32



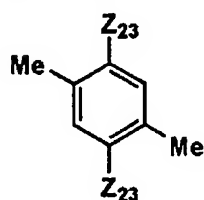
C11-33



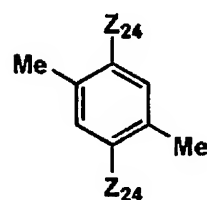
C11-34



C11-35



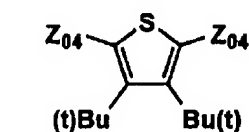
C11-36



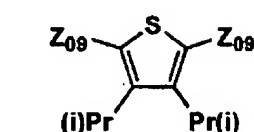
C11-37

C11-38

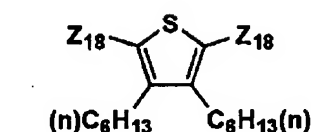
C11-39



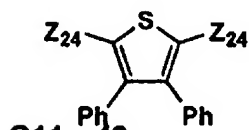
C11-40



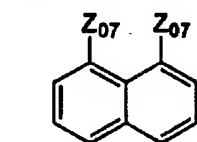
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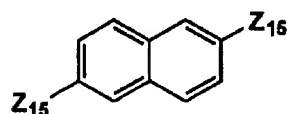
C11-42



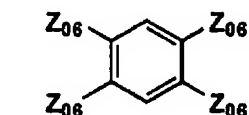
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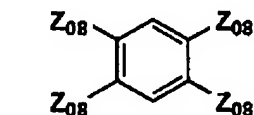
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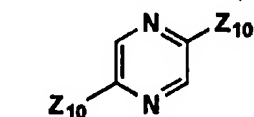
C11-45



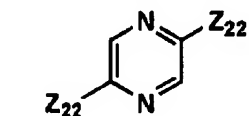
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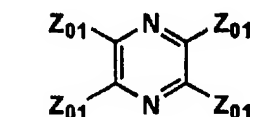
C11-47



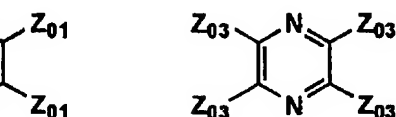
C11-48



C11-49

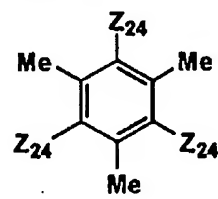
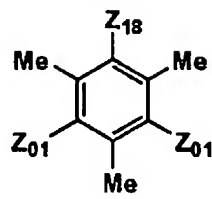
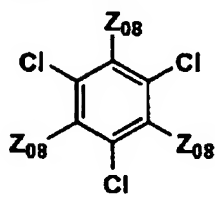
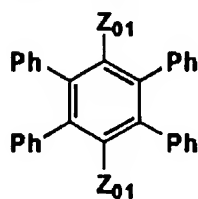


C11-50



C11-51

C11-52

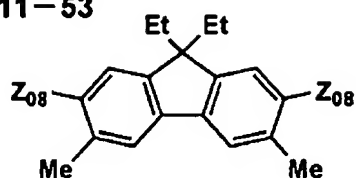


[0780]

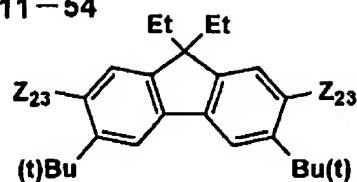
[Chemical formula 477]



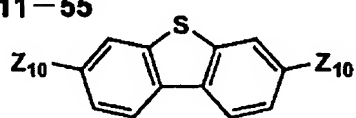
C11-53



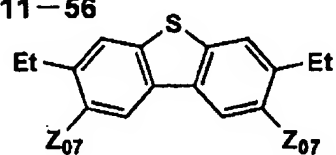
C11-54



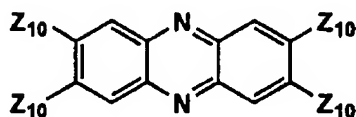
C11-55



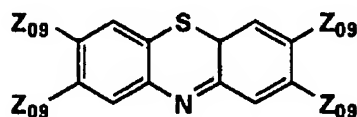
C11-56



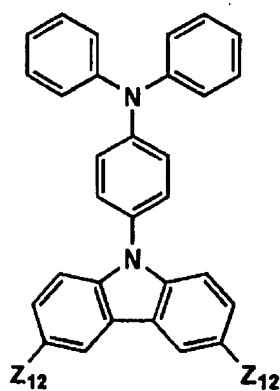
C11-57



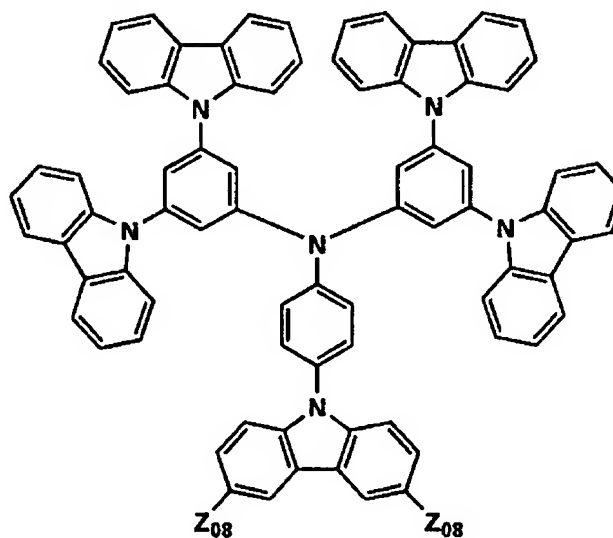
C11-58



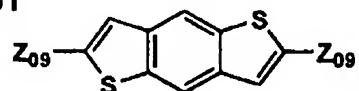
C11-59



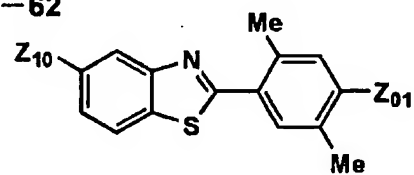
C11-60



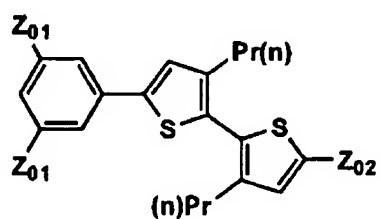
C11-61



C11-62



C11-63



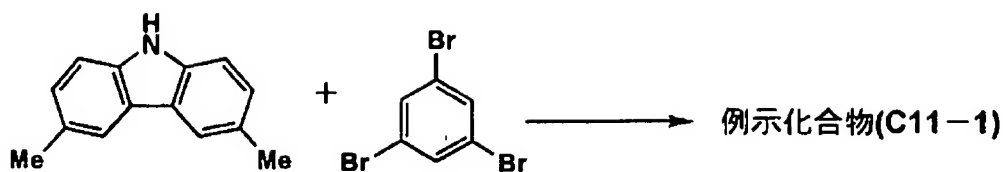
[0781]As for the molecular weight of the compound concerning this invention, it is preferred that it is 600-2000. Tg (glass transition temperature) goes up that molecular weights are 600-2000, heat stability improves, and an element life is improved. More desirable molecular weights are 800-2000.

[0782]The compound concerning this invention Tetrahedron Lett., 39 (1998), 2367 - 2370 pages, Japan JP,3161360,B, Angew.Chem.Int.Ed., 37 (1998), 2046 - 2067 pages, Tetrahedron Lett., 41 (2000), 481 - 484 pages, Synth.Comm., 11 (7), The engineer engaged in this business can manufacture a synthetic reaction given in (1981), 513 - 519 pages and Chem.Rev., 2002 and 102, 1359 - 1469 pages, etc. with a well-known synthesizing method. Although an example of a synthetic pathway is shown about compound C11-1 and C11-21 which were illustrated below, it is possible to manufacture with the other methods that a compound is also the same, said document, and publicly known synthetic methods.

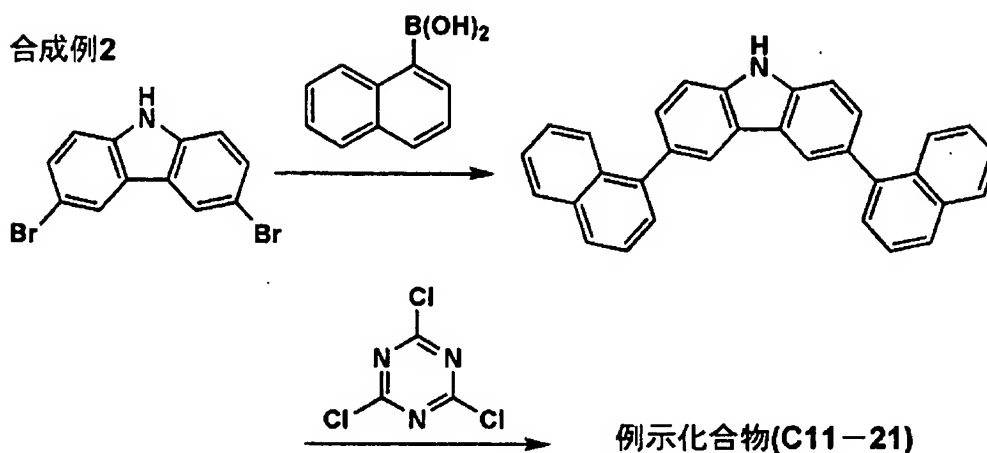
[0783]

[Chemical formula 478]

## 合成例1



## 合成例2



[0784]The compound (compound which comprises Si and a carbazole derivative) denoted by the general formula (C12-1) concerning this invention is explained.

[0785]R expresses a hydrogen atom or a substituent among the formula of a general formula (C12-1). As a substituent, an aliphatic hydrocarbon machine, an aromatic series machine, and an aromatic series hetero ring machine are expressed, it is an aliphatic hydrocarbon machine preferably -- more -- desirable -- an alkyl group (a methyl group.) They are alkenyl groups (a vinyl group, a propenyl machine, a styryl machine, etc.), such as an ethyl group, i-propyl group, a hydroxyethyl machine, a methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, and a cyclohexyl group. These alkyl groups may have a substituent.

[0786]L expresses the phenylene group which does not have a mere joint hand or substituent.

[0787]A expresses carbazole residue, and when a binding site with L is only N of a carbazole skeleton, The alkyl groups which may have a substituent in at least one or more substitution parts of carbazole residue, respectively (a methyl group, an ethyl group, i-propyl group, a hydroxyethyl machine, a methoxymethyl machine, a trifluoromethyl group, t-butyl group, a cyclopentyl group, a cyclohexyl group, etc.) . However, it is not t-butyl group when replacing by the 2nd place of a carbazole ring, and the 7th place. An alkyloxy machine (a methoxy group, an ethoxy basis, i-propoxy group, a butoxy machine, etc.), aryloxy groups (phenoxy group etc.) and an alkylthio group (a methylthio group.) Arylthio groups, such as an ethyl thio group and i-pro PIRUKIO machine (phenylthio group etc.), An alkylamino group (a dimethylamino group, a diethylamino machine, an ethyl methylamino machine, etc.), arylamino machines (an ANIRINO machine, a diphenylamino machine, etc.) or a heterocyclic machine (a frill machine.) A thienyl group, a pyrrole group, a pyrimidyl machine, a pyrazine machine, a triazine machine, A pyrrolidyl machine, a pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, The phenyl groups (a trill machine, a KISHIRIRU machine, a trimethyl phenyl machine, a tetramethyl phenyl group, a biphenyl machine, a terphenyl machine, etc.) or amino group which has substituents, such as a benzothiazolyl machine and a benzoxazolyl machine, is replaced. When at least N of a carbazole skeleton is except, [ combination with L ] the branching alkyl group (i-propyl group.) which may have a substituent in N, respectively alkyloxy machines (a methoxy group.), such as s-butyl group, t-butyl group, and t-Amir machine Aryloxy groups, such as an ethoxy basis, i-propoxy group, and a butoxy machine (phenoxy group etc.), An alkylthio group (a methylthio group, an ethyl thio group, i-pro PIRUKIO machine, etc.), arylthio groups (phenylthio group etc.) and an alkylamino group (a dimethylamino group.) arylamino machines (an ANIRINO machine.), such as a diethylamino machine and an ethyl methylamino machine heterocyclic machines (a frill machine and a thienyl group.), such as a diphenylamino machine A pyrrole group, a pyrimidyl machine, a pyrazine machine, a triazine machine, a pyrrolidyl machine, A pyrazolyl machine, an imidazolyl group, a pyridyl group, a benzimidazolyl machine, The phenyl groups (a trill machine, a KISHIRIRU machine, a trimethyl phenyl machine, a tetramethyl phenyl group, a biphenyl machine, a terphenyl machine, etc.) or amino group which has substituents, such as a benzothiazolyl machine and a benzoxazolyl machine, is replaced. 4 is preferred although n expresses the integer of 3 or 4.

[0788]In order to produce a highly efficient organic EL device, it is desirable to use the material which generally forms amorphous glass possible [ a vacuum evaporation method ] and uniform. There is a problem that a stable element is unproducible from it being easy to crystallize since only the element glass transition temperature is low and is lacking in heat

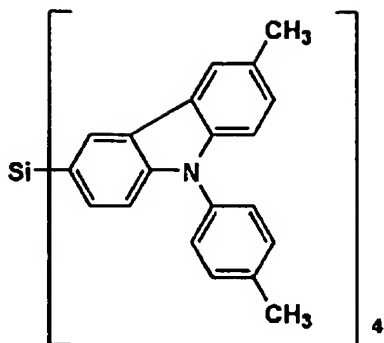
resistance can be produced as the molecular weight of the material used is less than 350, and the stability of a glass state is missing etc. On the other hand, in the amount of polymers in which a molecular weight exceeds 3000, there is a tendency that membrane formation by vacuum deposition cannot be performed, and when producing highly efficient organic electroluminescence, it has been a problem.

[0789]Although the example of a concrete compound is shown below, the compound in this invention is not limited to these.

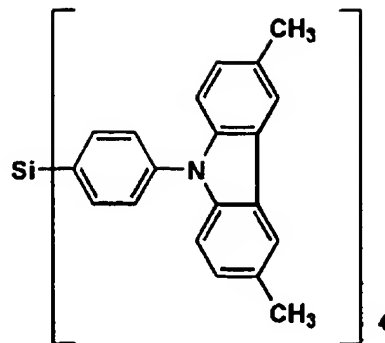
[0790]

[Chemical formula 479]

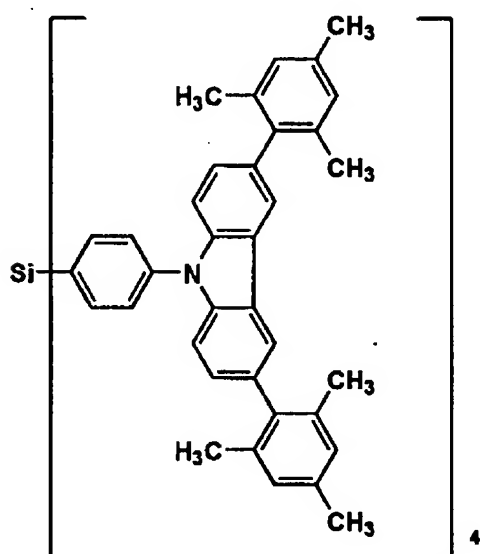
C12-A-1



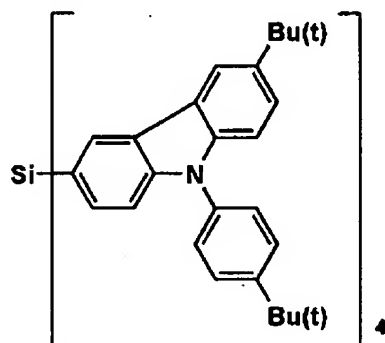
C12-A-2



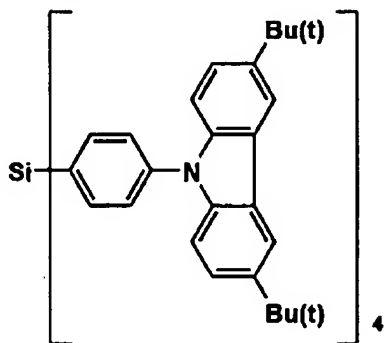
C12-A-3



C12-A-4



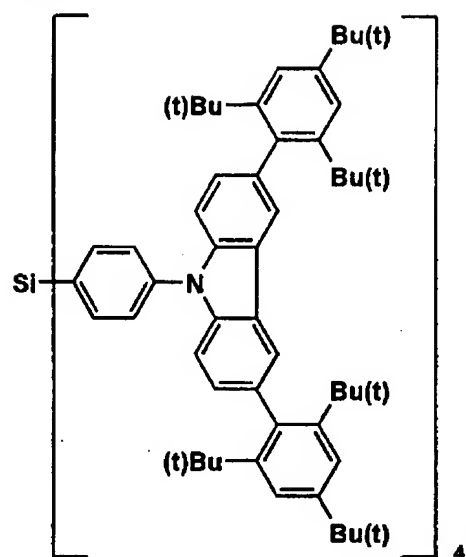
C12-A-5



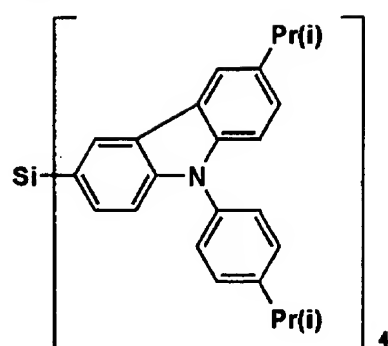
[0791]

[Chemical formula 480]

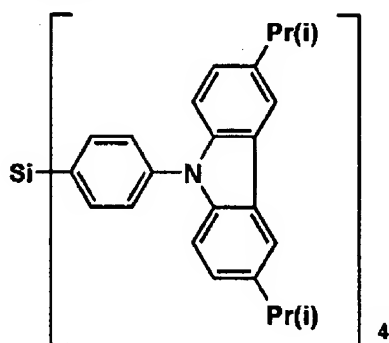
C12-A-6



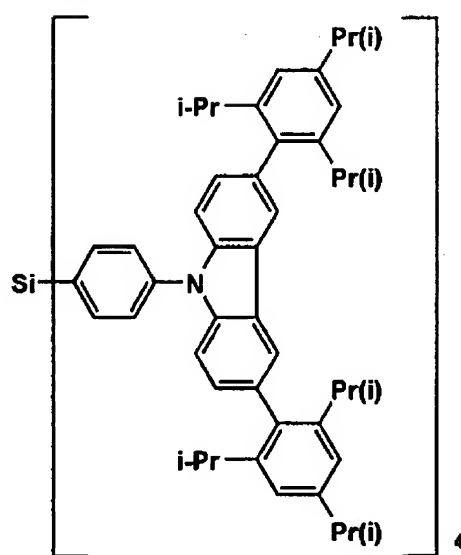
C12-A-7



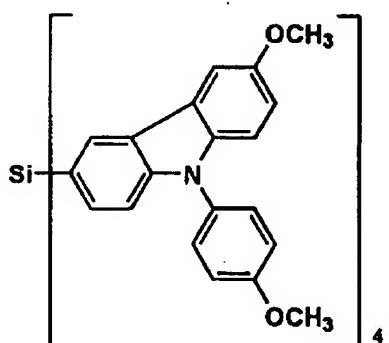
C12-A-8



C12-A-9



C12-A-10

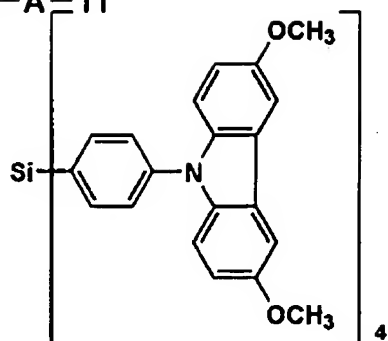




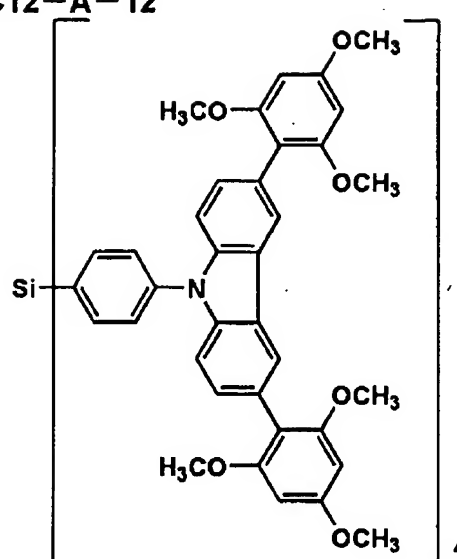
[0792]

[Chemical formula 481]

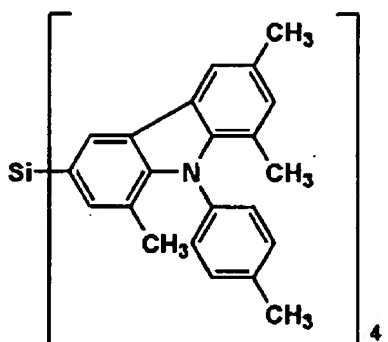
C12-A-11



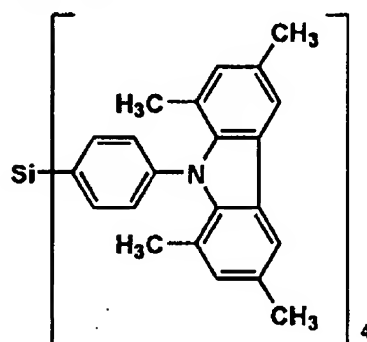
C12-A-12



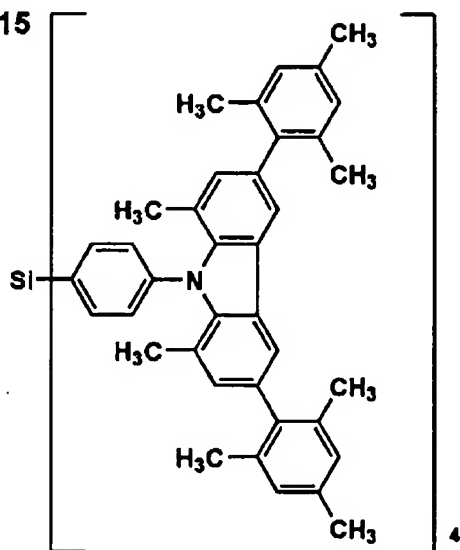
C12-A-13



C12-A-14



C12-A-15



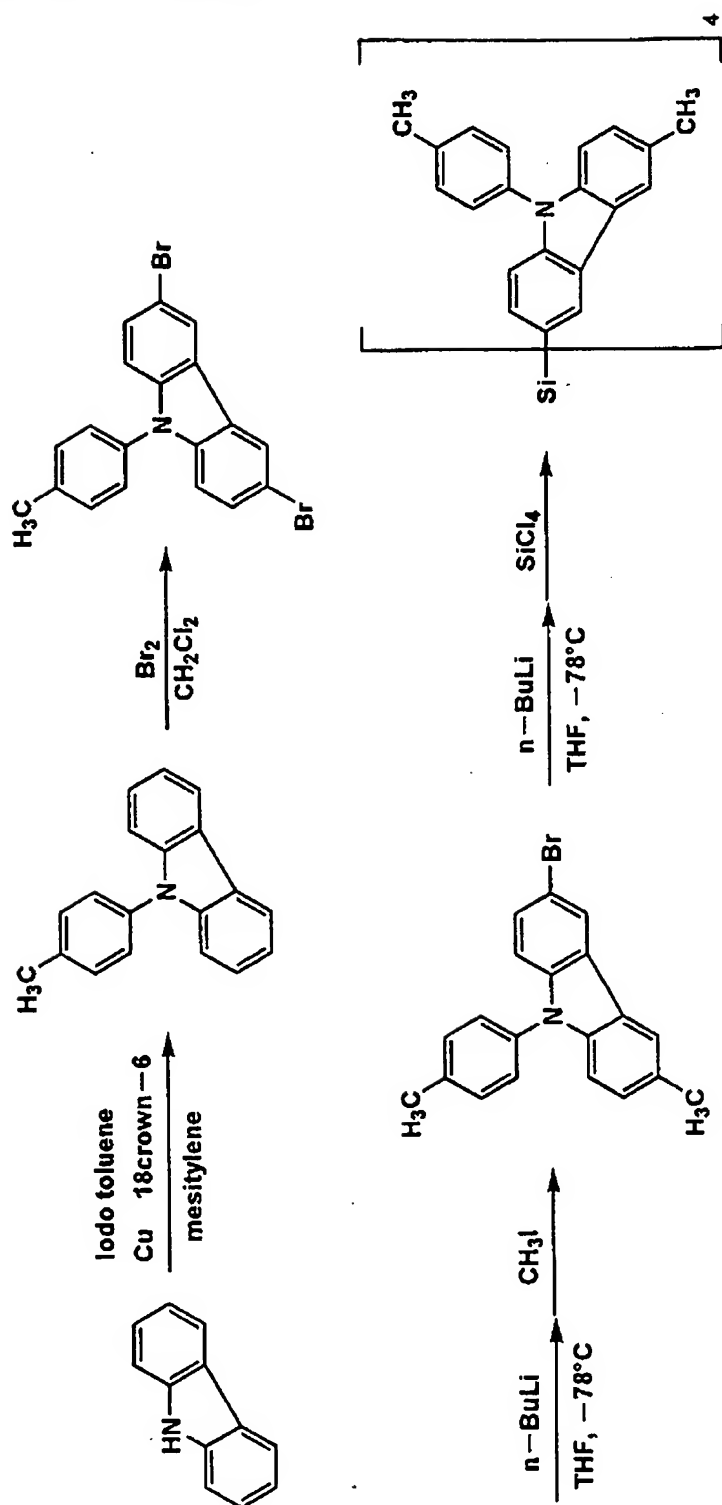
[0793][ the compound denoted by the above-mentioned general formula (C12-1) ] which layer (for example, an electron hole transportation layer.) which constitutes an organic EL device as shown in the following When it contains in a luminous layer as a host compound so that it may mention later especially although it may contain in a luminous layer, an electron hole block layer, an electron transport layer, etc., Or when contained in the layer which adjoins a luminous layer, it turned out that the organic EL device which showed high luminescence luminosity and high luminous efficiency and whose endurance improved further can be provided.

[0794]As content in the inside of any one layer which constitutes the organic EL device of the compound denoted by the general formula (C12-1) concerning this invention, desirable still more preferably, it is 80 to 95 mass % that it is more than 50 mass %, and it is 90 to 95 mass % especially preferably.

[0795]The compound concerning this invention denoted by a general formula (C12-1) can be conventionally manufactured by a publicly known method. Although an example of a synthetic pathway is shown about compound C12-A-1 illustrated below, it is possible to manufacture with the other methods that a compound is also the same, following document, and publicly known synthetic methods.

[0796]

[Chemical formula 482]



[0797]Buchanan. [ Tucker J.Chem.Soc., 1958, 2750Steinhoff Henry, J.Org.Chem., 29 and 1964, 2808Spialter et al, J.Amer.Chem.Soc., 77 and 1955, and 6227 each compound ] It can identify with NMR (nuclear magnetic resonance spectrum) and a mass spectrum.

[0798]The compound denoted by general formula (D1-1) - (D1-4) is explained.

[0799]In a general formula (D1-1),  $X_{11}$ ,  $X_{12}$ ,  $X_{13}$ , and  $X_{14}$  express C-Ra or N, and at least one of  $X_{11}$ ,  $X_{12}$ ,  $X_{13}$ , and the  $X_{14}$  expresses N. In a general formula (D1-3),  $X_{31}$  and  $X_{32}$  express C-Rb or N, and at least one of  $X_{31}$  and the  $X_{32}$  expresses N.

[0800]In general formula (D1-1) - (D1-4), Ra, Rb,  $R_{23}$ ,  $R_{24}$ ,  $R_{43}$ ,  $R_{44}$ ,  $R_{45}$ , and  $R_{46}$  express a hydrogen atom or a substituent respectively independently.  $R_{11}$ ,  $R_{12}$ ,  $R_{21}$ ,  $R_{22}$ ,  $R_{31}$ ,  $R_{32}$ ,  $R_{41}$ , and  $R_{42}$  express a substituent.

[0801]A general formula (D1-3) sets and  $Z_1$  expresses an atomic group required to form a ring. The hydrocarbon ring which is not limited as an atomic group required to form the ring denoted by  $Z_1$  especially if it is a ring more than 3 member, and comprised only a carbon atom and a hydrogen atom may be sufficient, and the heterocycle containing the hetero atom may be sufficient. It is a ring of 5 - 7 member preferably. These may have two or more arbitrary substituents independently, respectively.

[0802]In general formula (D1-1) - (D1-4), Ra, Rb,  $R_{23}$ ,  $R_{24}$ ,  $R_{43}$ ,  $R_{44}$ ,  $R_{45}$ ,  $R_{46}$ ,  $R_{11}$ , When  $R_{12}$ ,  $R_{21}$ ,  $R_{22}$ ,  $R_{31}$ ,  $R_{32}$ ,  $R_{41}$ , and  $R_{42}$  express a substituent, [ as the substituent ] an alkyl group (for example, a methyl group, an ethyl group, an isopropyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, a perfluoro propyl group, A perfluoro n-butyl group, a perfluoro t-butyl group, t-butyl group, etc., A cycloalkyl machine (for example, a cyclopentyl group, a cyclohexyl group, etc.), aralkyl groups (for example, a benzyl

group, 2-FENECHIRU machine, etc.) and an aryl group (for example, a phenyl group.) alkoxy groups (for example, an ethoxy basis.), such as a naphthyl group, p-trill machine, and p-chlorophenyl machine Aryloxy groups (for example, phenoxy group etc.), such as an isopropoxy group and a butoxy machine, a cyano group, a hydroxyl group, halogen atoms (a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc.), etc. are mentioned. It is, even if replaced further, and these bases are \*\*.

[0803]In general formula (D1-1) - (D1-4), the case where  $R_{11}$ ,  $R_{12}$ ,  $R_{21}$ ,  $R_{22}$ ,  $R_{31}$ ,  $R_{32}$ ,  $R_{41}$ , and  $R_{42}$  are an alkyl group or an aryl group is the most preferred.

[0804]Next, the compound denoted by general formula (D1-5) - (D1-8) is explained.

[0805]In a general formula (D1-5), Ar expresses an aromatic series ring, A expresses disconjugation heterocycle, and n1 expresses the integer of 2-6.

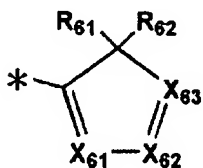
[0806]In a general formula (D1-6), B expresses disconjugation heterocycle and n2 expresses the integer of 2-6. As an aromatic series ring denoted by Ar, benzene, NAFUTAREN, anthracene, triazine, a franc, CHIOFEN, pyrrole, etc. are mentioned. It will not be limited especially if it is the disconjugation heterocycle more than 3 member as disconjugation heterocycle denoted by A and B. It is the disconjugation desirable heterocycle of 5 - 7 member, and is the disconjugation most desirable heterocycle of 5 members. These may have two or more arbitrary substituents independently, respectively. The disconjugation heterocycle as used in the field of this invention expresses the heterocyclic compound except a conjugate heterocyclic compound which has not carried out conjugate among heterocyclic compounds.

[0807]As for n2, in a general formula (D1-6), it is preferred that it is 2 or 3. As for B, it is preferred to be expressed with a general formula (D1-7) or (D1-8) among the compounds denoted by a general formula (6). It is preferred to be expressed especially with a general formula (D1-7).

[0808]

[Chemical formula 483]

一般式(D1-7)

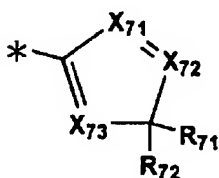


[0809]  $X_{61}$ ,  $X_{62}$ , and  $X_{63}$  express C-Rc or N among a formula, and at least one of  $X_{61}$ ,  $X_{62}$ , and the  $X_{63}$  expresses N. Rc expresses a hydrogen atom or a substituent and  $R_{61}$  and  $R_{62}$  express a substituent. \* Express a binding site with a benzene ring.

[0810]

[Chemical formula 484]

一般式(D1-8)



[0811]  $X_{71}$ ,  $X_{72}$ , and  $X_{73}$  express C-Rd or N among a formula, and at least one of  $X_{71}$ ,  $X_{72}$ , and the  $X_{73}$  expresses N. Rd expresses a hydrogen atom or a substituent and  $R_{71}$  and  $R_{72}$  express a substituent. \* Express a binding site with a benzene ring.

[0812]In a general formula (D1-7) and (D1-8),  $X_{61}$ ,  $X_{62}$ , and  $X_{63}$  express C-Rc or N, and at least one of  $X_{61}$ ,  $X_{62}$ , and the  $X_{63}$  expresses N.  $X_{71}$ ,  $X_{72}$ , and  $X_{73}$  express C-Rd or N, and at least one of  $X_{71}$ ,  $X_{72}$ , and the  $X_{73}$  expresses N. Rc and Rd express a hydrogen atom or a substituent respectively independently.  $R_{61}$ ,  $R_{62}$ ,  $R_{71}$ , and  $R_{72}$  express a substituent. \*

Express a binding site with a benzene ring. The substituent in case Rc, Rd,  $R_{61}$ ,  $R_{62}$ ,  $R_{71}$ , and  $R_{72}$  express a substituent is synonymous with the substituent shown by general formula (D1-1) - (D1-4).

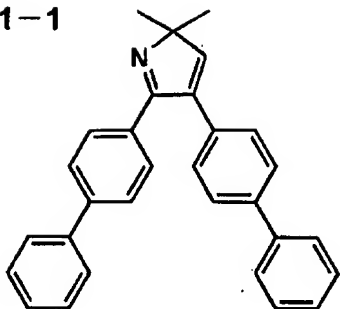
[0813]The example of a compound denoted by general formula (D1-1) - (D1-6) is shown below.

[0814]

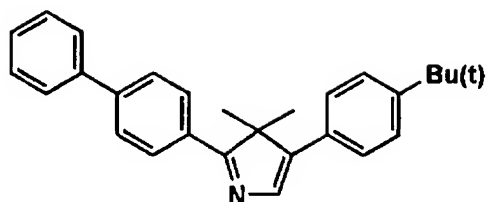


[Chemical formula 485]

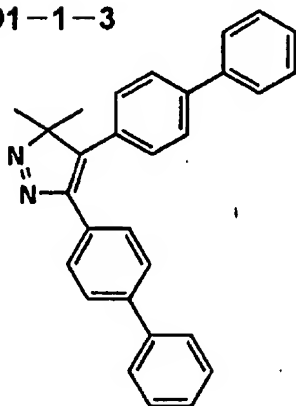
D1-1-1



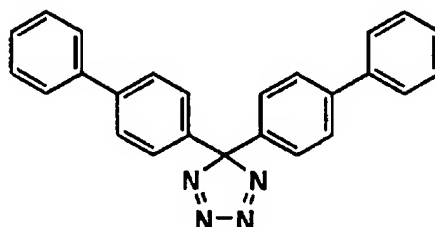
D1-1-2



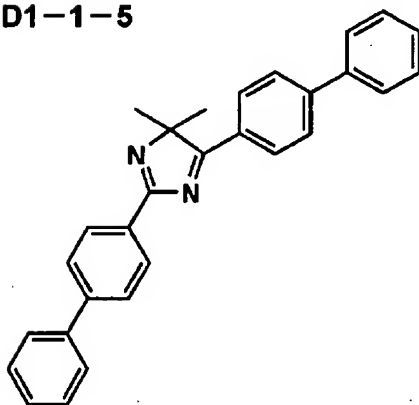
D1-1-3



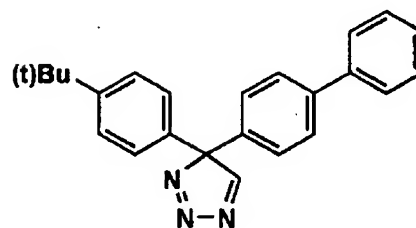
D1-1-4



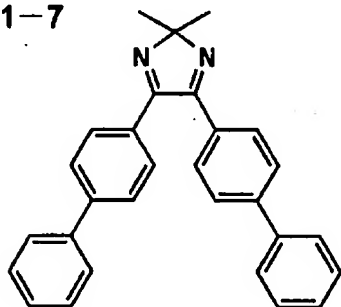
D1-1-5



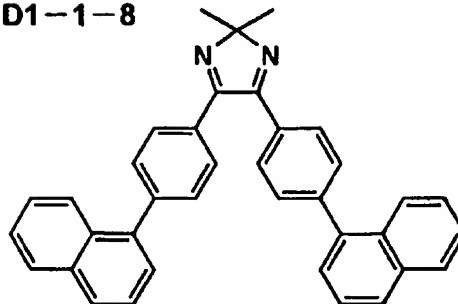
D1-1-6



D1-1-7



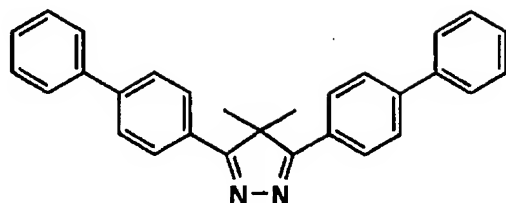
D1-1-8



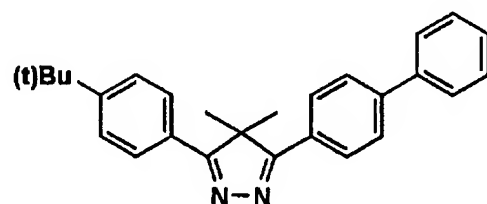
[0815]

[Chemical formula 486]

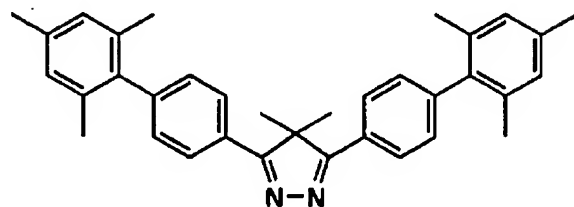
D1-2-1



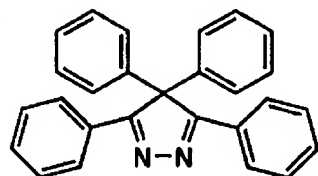
D1-2-2



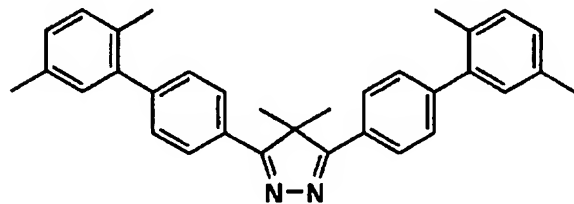
D1-2-3



D1-2-4



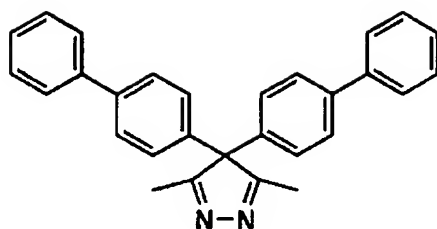
D1-2-5



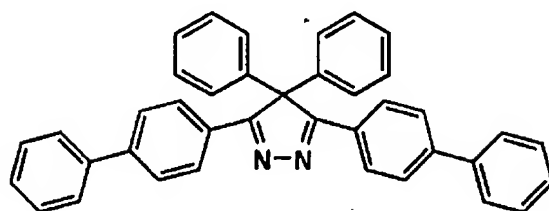
[0816]

[Chemical formula 487]

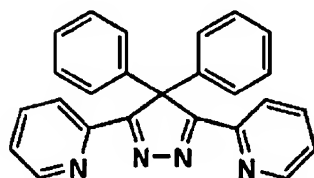
D1-2-6



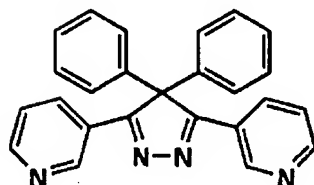
D1-2-7



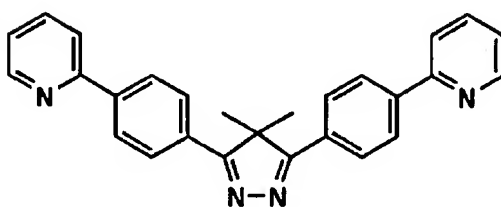
D1-2-8



D1-2-9



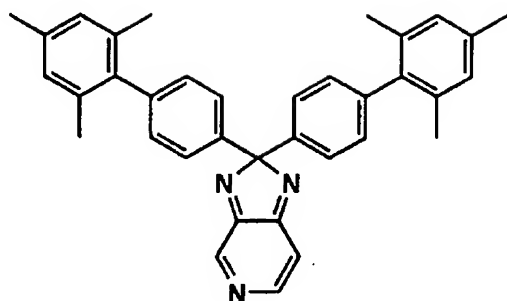
D1-2-10



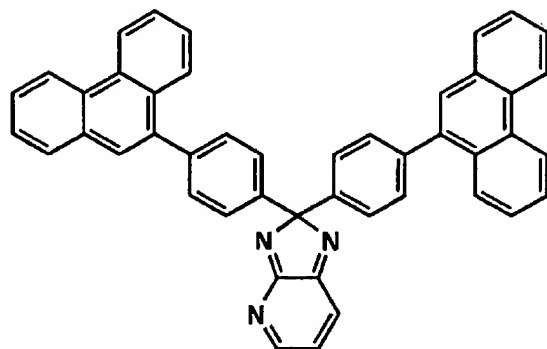
[0817]

[Chemical formula 488]

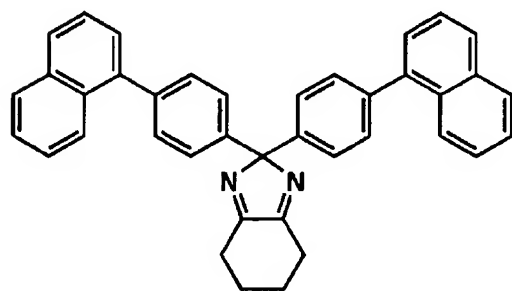
**D1-3-1**



**D1-3-2**



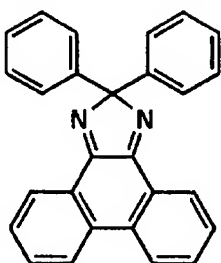
**D1-3-3**



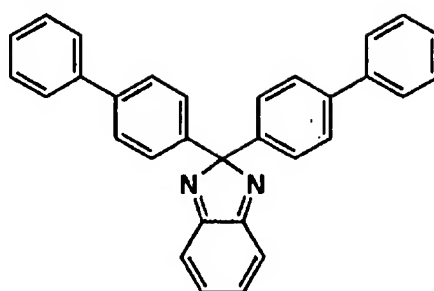
[0818]

[Chemical formula 489]

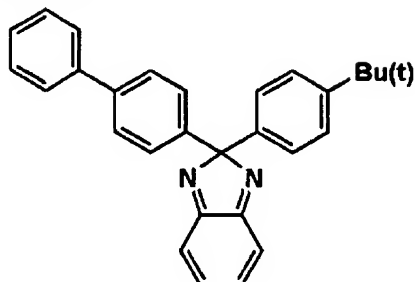
**D1-4-1**



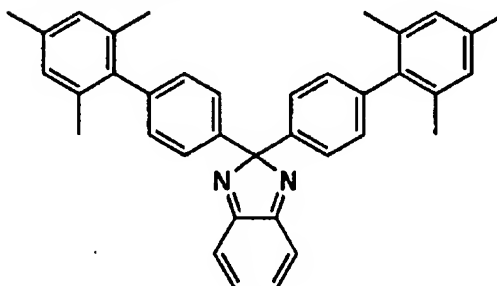
**D1-4-2**



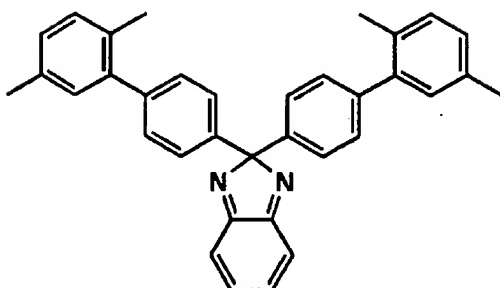
**D1-4-3**



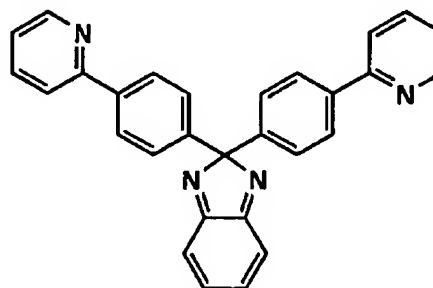
**D1-4-4**



**D1-4-5**



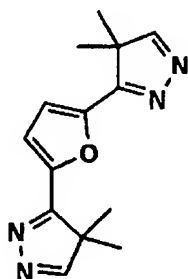
**D1-4-6**



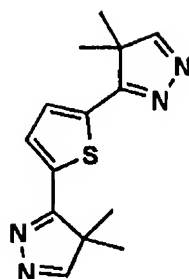
[0819]

[Chemical formula 490]

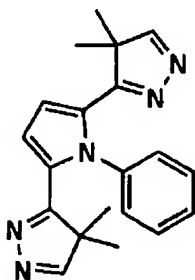
D1-5-1



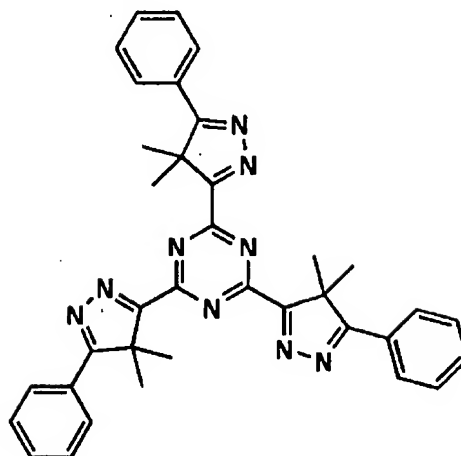
D1-5-2



D1-5-3



D1-5-4

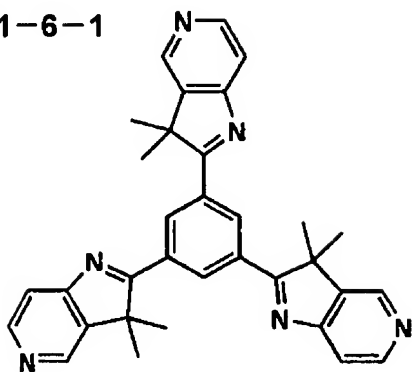


[0820]

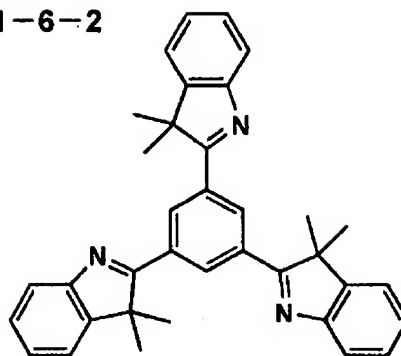


[Chemical formula 491]

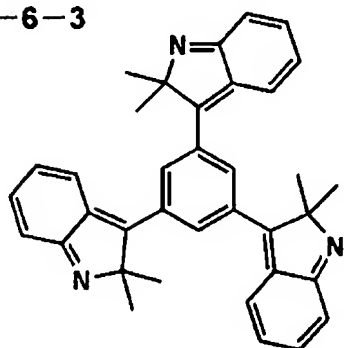
D1-6-1



D1-6-2



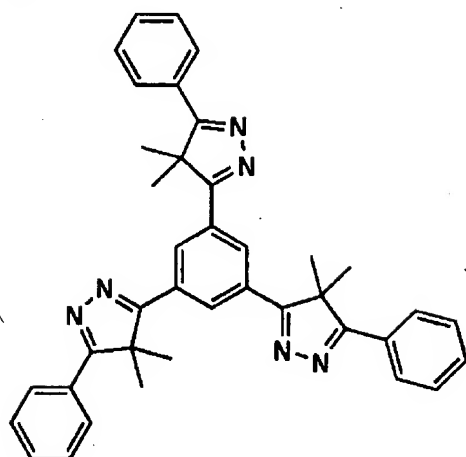
D1-6-3



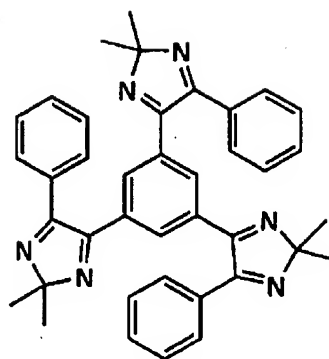
[0821]

[Chemical formula 492]

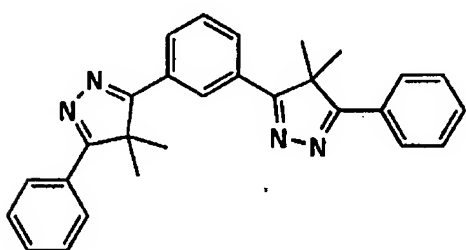
D1-7-1



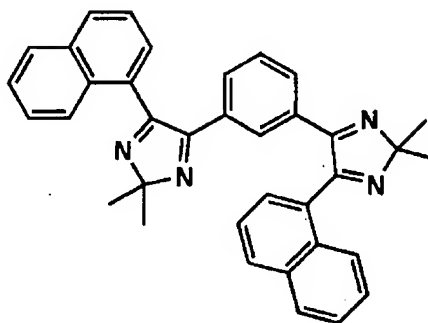
D1-7-2



D1-7-3



D1-7-4



[0822]The example of typical manufacture of these compounds is shown below. It can manufacture by a method with the same said of other compounds.

[0823](Synthetic example) Under the nitrogen air current, it dissolved in 300 ml of drying toluene, and 40 g of synthetic compounds (2) and NaH17g of the compound (D1-2-1) were kept at 60 degrees. What dissolved 37 g of compounds (1) in 100 ml of drying toluene was dropped at this solution, and heating flowing back was carried out to it for 8 hours. Then, water was gradually added in reaction liquid and strong sulfuric acid neutralized. Ethyl acetate, a tetrahydro franc, and water extracted the organic layer after liquid separation, and it was made to dry with sodium sulfate. After carrying out decompression distilling off of the solvent, when re-crystallized with toluene, 20 g of compounds (3) were obtained.

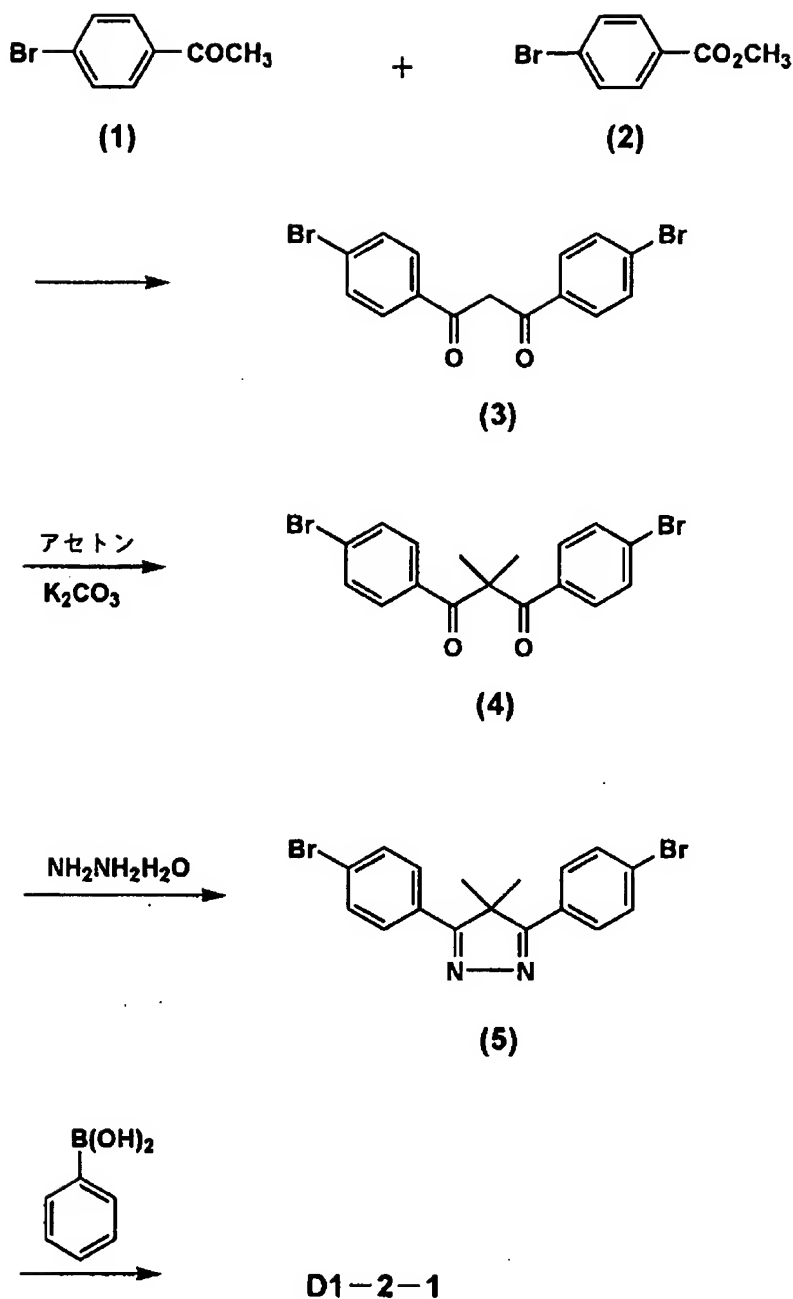
[0824]20 g of compounds (3) were dissolved in 250 ml of acetone, the potassium carbonate 29g and the iodine methane 30g were added, and it agitated at room temperature for 1.5 days. Reaction liquid was neutralized for acetone after decompression distilling off. The organic layer was extracted after adding ethyl acetate, a tetrahydro franc, and water, and it was made to dry with sodium sulfate. Ethyl acetate: Hexane carried out column refining by \*\*\*\*\* of 1:15, and obtained 9.7 g of compounds (4).

[0825]5 g of compounds (4) and the hydrazine 1 hydrate 0.8g were dissolved in dichloro ethane, heating flowing back was carried out for 7 hours, and 3.5 g of compounds (5) were obtained.

[0826]A 2.0-g compound (D1-2-1) was obtained by making 3 g of compounds (5) react to 1.3 g of phenylboronic acid under existence of potassium carbonate and a palladium catalyst among the solvent of a two-layer system which consists of 5 ml of 60 ml of tetrahydro franc-water. It checked that it was an object with NMR (nuclear magnetic resonance spectrum) and a mass spectrum.

[0827]

[Chemical formula 493]



[0828]The compound denoted by general formula (D2-1) - (D2-3) is explained.

[0829]In said general formula (D2-1) - (D2-3),  $Z_1$  -  $Z_3$  express an atomic group required to form

seven disconjugation membered-rings respectively.  $Z_1 - Z_3$  may have a substituent respectively.  $X_{11} - XX_{14}$  express C-Ra or a nitrogen atom respectively. In general formula (D2-1) - (D2-3), Ra,  $R_{11} - R_{14}$  express a hydrogen atom or a substituent respectively independently. When Ra,  $R_{11} - R_{14}$  express a substituent respectively, [ as the substituent ] an alkyl group (for example, a methyl group, an ethyl group, an isopropyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, a perfluoro propyl group, A perfluoro n-butyl group, a perfluoro t-butyl group, t-butyl group, etc., A cycloalkyl machine (for example, a cyclopentyl group, a cyclohexyl group, etc.), Aalkyl groups (for example, a benzyl group, 2-FENECHIRU machine, etc.), an aryl group. (For example, a phenyl group, a naphthyl group, p-trill machine, p-chlorophenyl machine, etc.), Alkoxy groups (for example, an ethoxy basis, an isopropoxy group, a butoxy machine, etc.), aryloxy groups (for example, phenoxy group etc.), a cyano group, a hydroxyl group, halogen atoms (for example, a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc.), etc. are mentioned. These bases may be replaced further.

[0830]In said general formula (D2-3),  $\sigma$  of  $R_{21}$  and  $R_{22}$  is more than -0.5 and 0.0 or less substituent respectively.

[0831] $\sigma$  value of a substituent in this invention, [ as an example of representation of more than -0.5 and 0.0 or less substituent ] A methyl group, an ethyl group, a cyclo propyl group, n-propyl group, an iso-propyl group, A cyclo butyl group, n-butyl group, an iso-butyl group, n-pentyl group, a cyclohexyl group, a hydroxyl machine, an alkyloxy machine (for example, a methoxy group, an ethoxy basis; a propoxy group, a dodecyloxy machine, a benzyloxy group), etc. are mentioned.

[0832] $\sigma$  value is the substituent constant called for from the electronic effects of the substituent exerted on hydrolysis of benzoic ester by Hammett etc.

23 journal OBU organic chemistry, 420-427 pages (1958), 14 experimental science lectures (Maruzen publishing company), physical organic chemistry (McGrawHill Book: 1940), A Drac design VII volume (Academic Press New York:1976), It is indicated in detail to C. HANSHU (C. Hansch) of the description, etc. in the structure-activity relationship (Nankodo: 1979) of a medicine, the 20th volume of journal OBU medical chemistry (Journal of Medical Chemistry), 304 pages, and 1977.

[0833]Subsequently, the compound denoted by general formula (D2-4) - (D2-6) concerning Claims 4-6 is explained.

[0834]In said general formula (D2-4),  $X_{21} - X_{24}$  express C-Rb or a nitrogen atom respectively. In general formula (D2-4) - (D2-6), Rb,  $R_{31} - R_{34}$ ,  $R_{41} - R_{48}$ ,  $R_{53} - R_{56}$  express a hydrogen atom or a substituent respectively independently. When Rb,  $R_{31} - R_{34}$ ,  $R_{41} - R_{48}$ ,  $R_{53} - R_{56}$  express a substituent respectively, as the substituent, it is synonymous with the substituent shown by above-mentioned general formula (D2-1) - (D2-3).

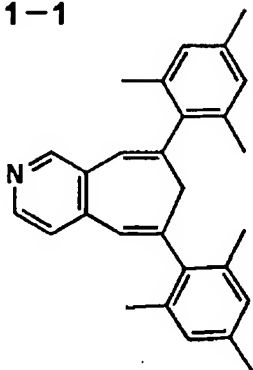
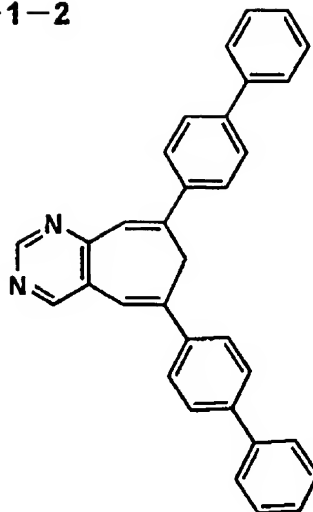
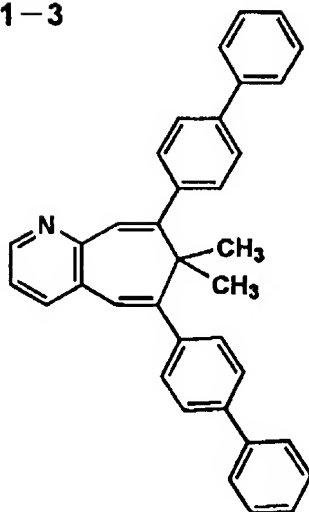
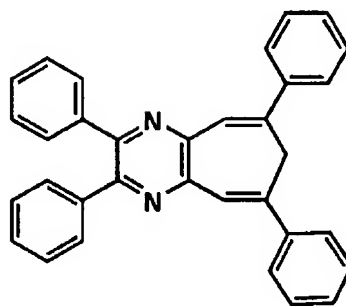
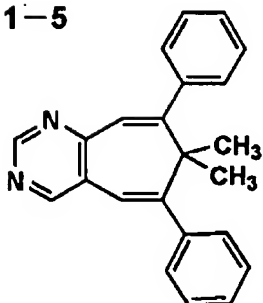
[0835]In said general formula (D2-6),  $\sigma$  of  $R_{51}$  and  $R_{52}$  is more than -0.5 and 0.0 or less substituent respectively. Specifically, it is synonymous with  $R_{21}$  in the above-mentioned general formula (D2-3), and  $R_{22}$ .

[0836]In said general formula (D2-4) - (D2-6), the case where  $R_{31}$ ,  $R_{32}$ ,  $R_{45}$ ,  $R_{46}$ ,  $R_{53}$ , and  $R_{54}$  are aryl groups respectively is preferred preferably.

[0837]Although the example of a compound denoted by said general formula (D2-1) - (D2-6) below is shown, this invention is not limited to these.

[0838]

[Chemical formula 494]

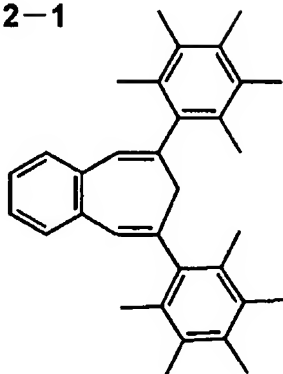
**D2-1-1****D2-1-2****D2-1-3****D2-1-4****D2-1-5**

[0839]

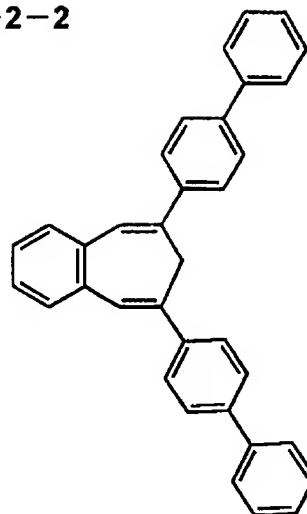


[Chemical formula 495]

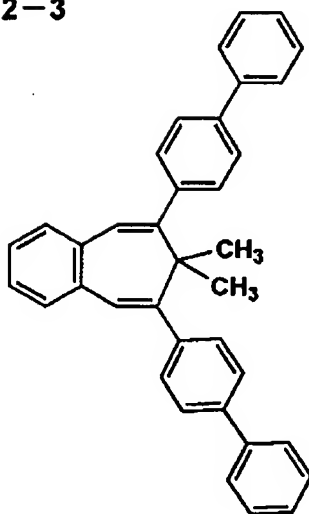
**D2-2-1**



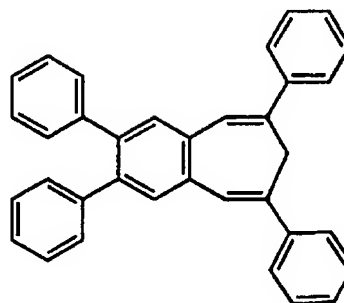
**D2-2-2**



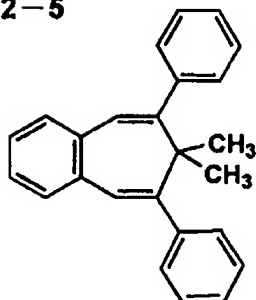
**D2-2-3**



**D2-2-4**

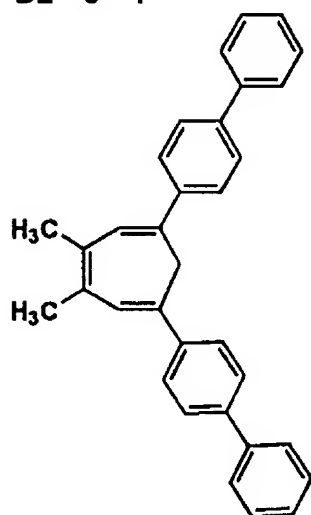
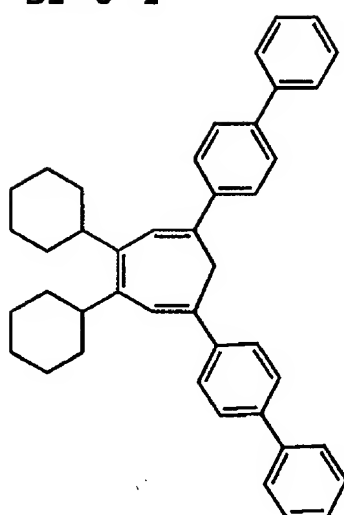
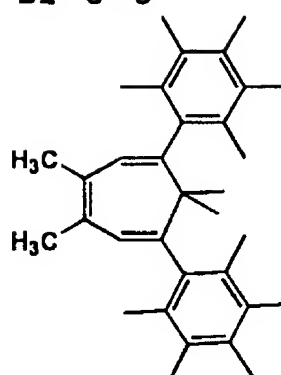
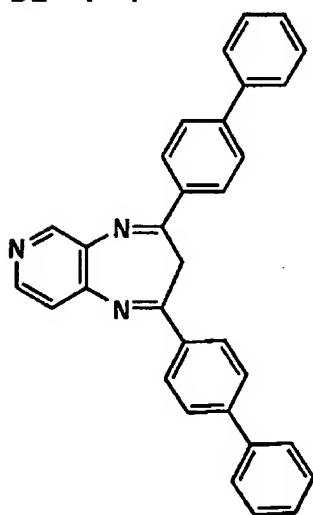
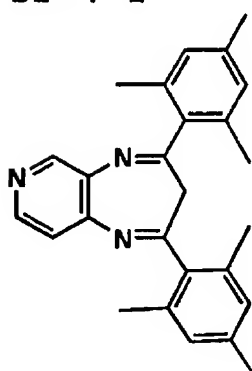
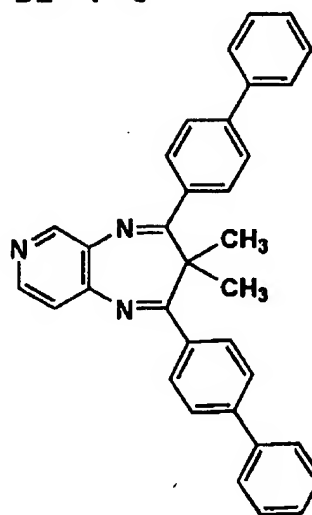


**D2-2-5**



[0840]

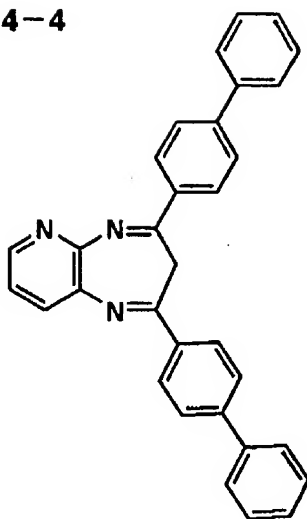
[Chemical formula 496]

**D2-3-1****D2-3-2****D2-3-3****D2-4-1****D2-4-2****D2-4-3**

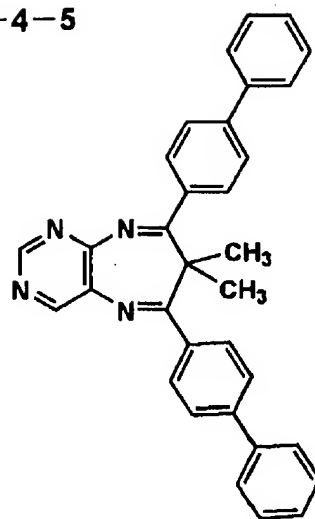
[0841]

[Chemical formula 497]

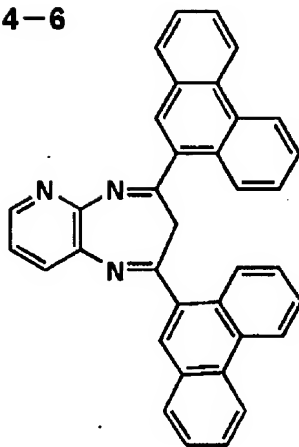
D2-4-4



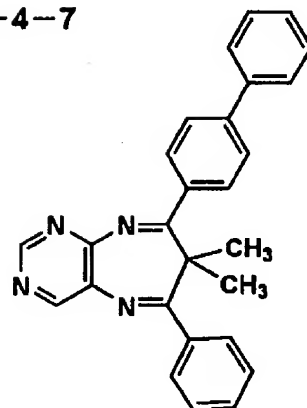
D2-4-5



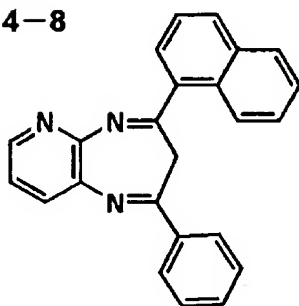
D2-4-6



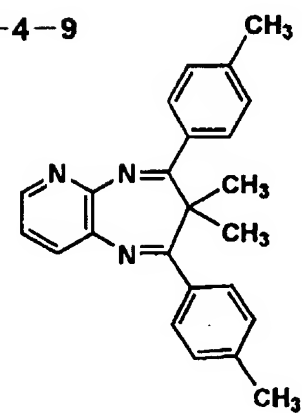
D2-4-7



D2-4-8



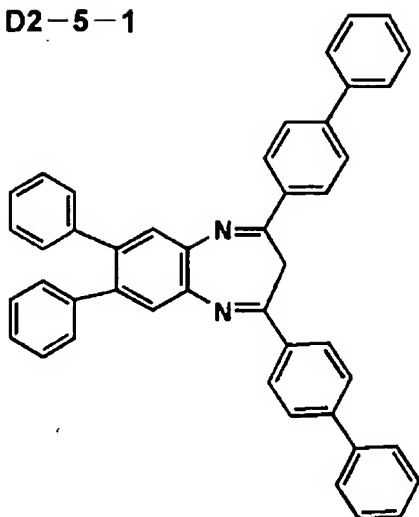
D2-4-9



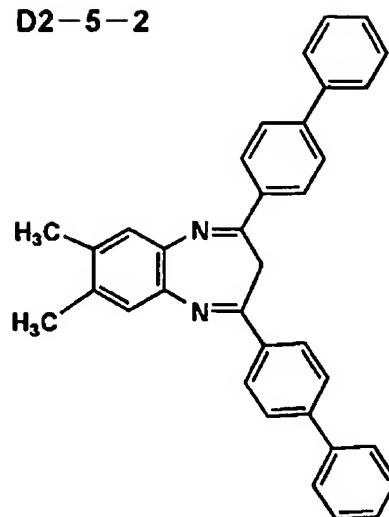
[0842]

[Chemical formula 498]

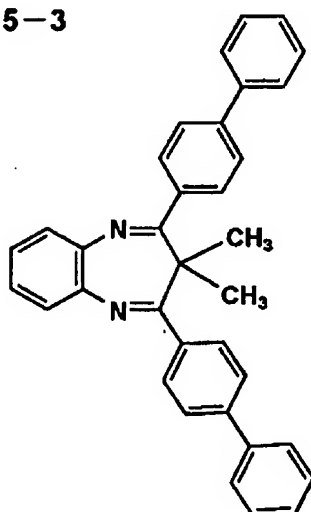
D2-5-1



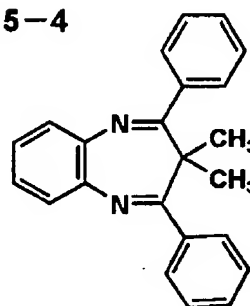
D2-5-2



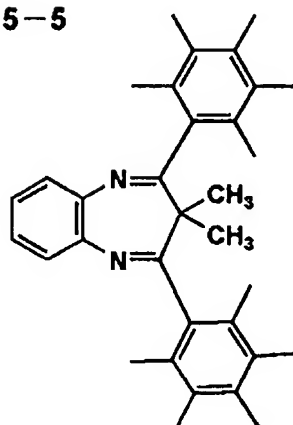
D2-5-3



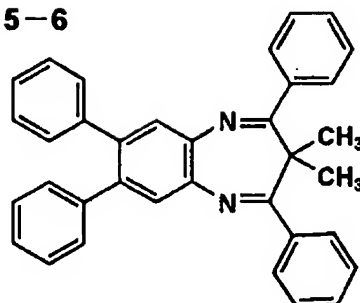
D2-5-4



D2-5-5



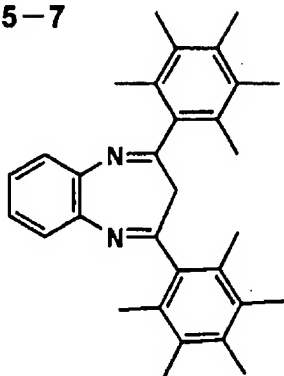
D2-5-6



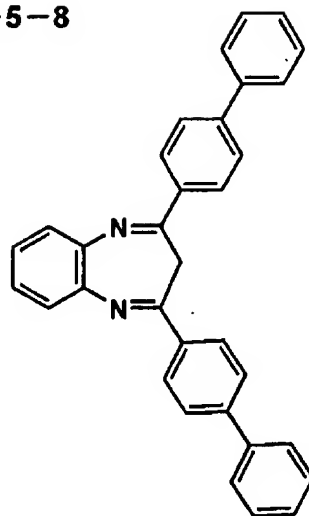
[0843]

[Chemical formula 499]

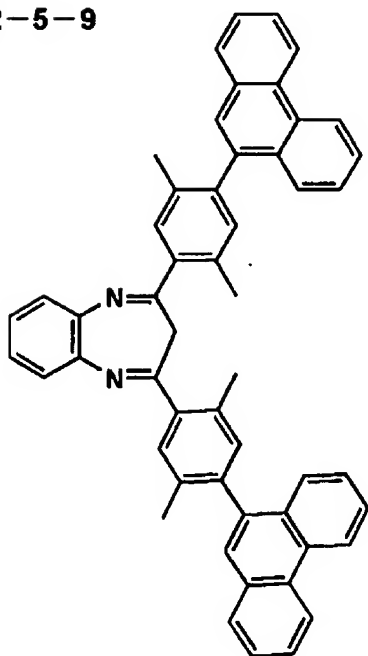
D2-5-7



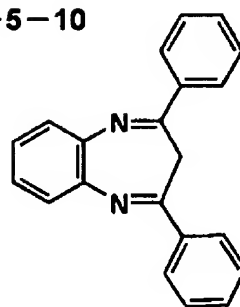
D2-5-8



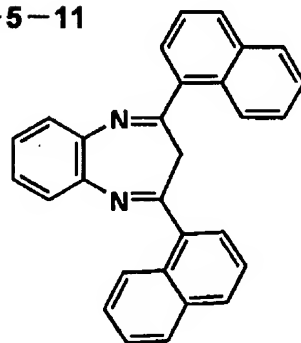
D2-5-9



D2-5-10

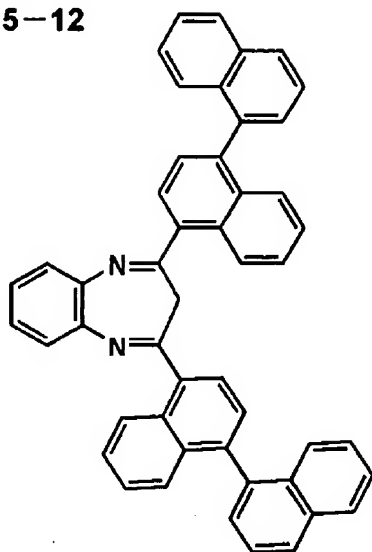
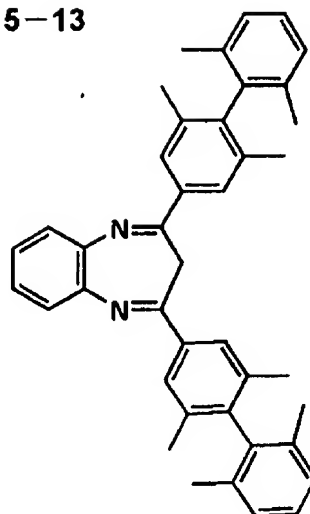


D2-5-11



[0844]

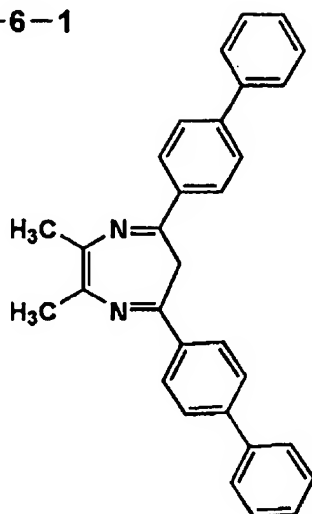
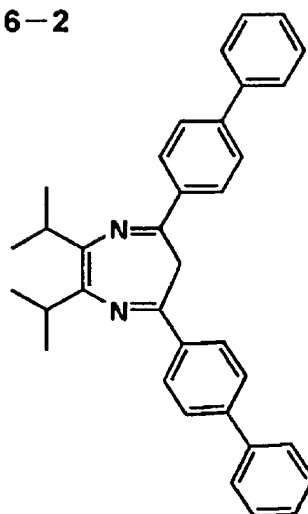
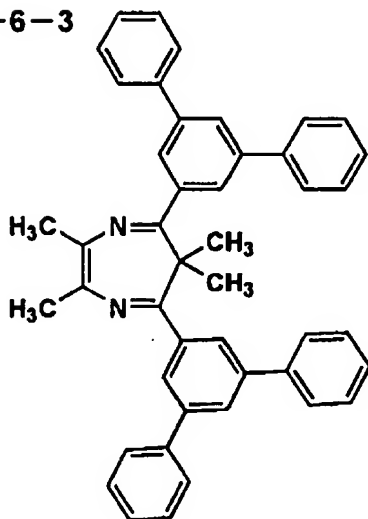
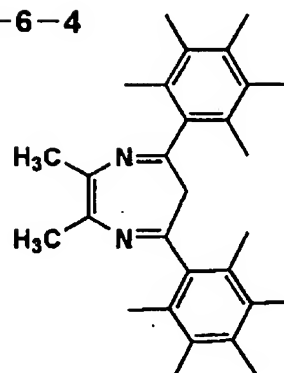
[Chemical formula 500]

**D2-5-12****D2-5-13**

[0845]



[Chemical formula 501]

**D2-6-1****D2-6-2****D2-6-3****D2-6-4**

[0846]The example of typical manufacture of the above-mentioned compound concerning this

invention is shown below. It can manufacture by a method with the same said of other compounds.

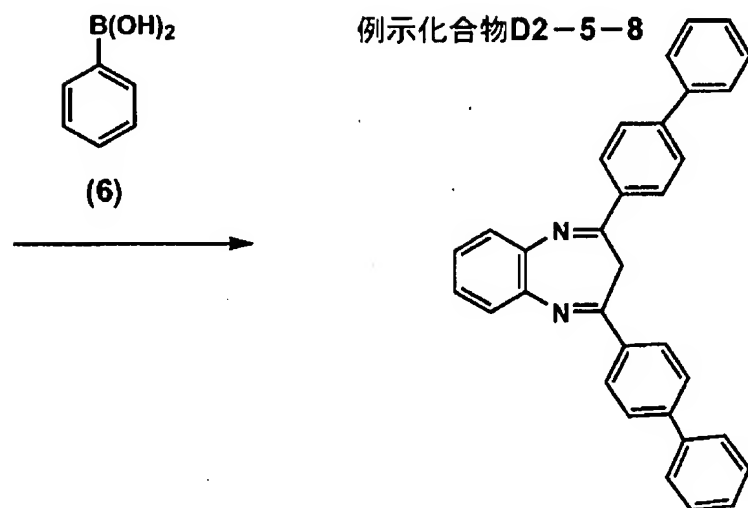
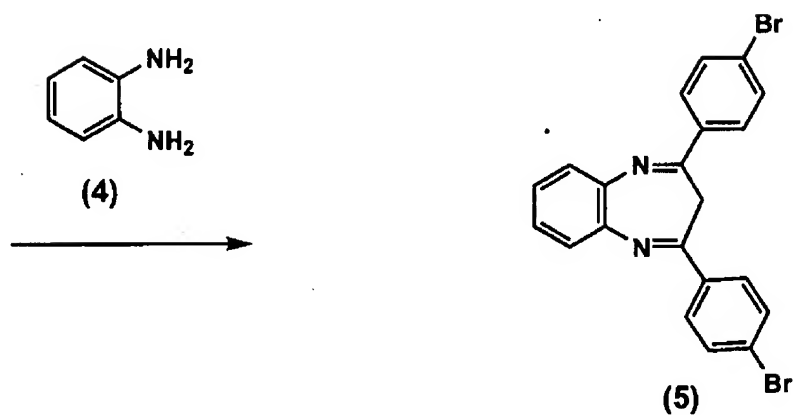
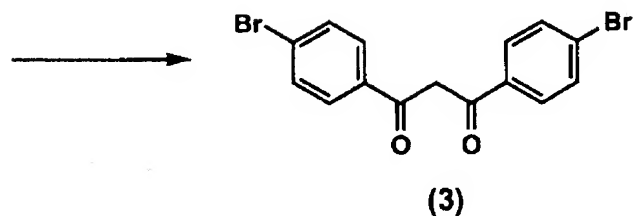
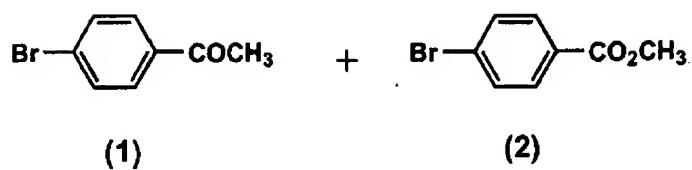
[0847](A synthetic example: Composition of illustration compound D2-5-8) Under the nitrogen air current, it dissolved in 300 ml of drying toluene, and 40 g of a compound (2) and 17 g of NaH were kept at 60 degrees. What dissolved 37 g of a compound (1) in 100 ml of drying toluene was dropped at this solution. It agitated after the end of dropping one whole day and night. Then, after adding strong sulfuric acid in reaction liquid and neutralizing in it, liquids were separated with ethyl acetate and water. The organic layer was extracted and it was made to dry with sodium sulfate. After carrying out decompression distilling off of the solvent, it re-crystallized with toluene and 20g of compounds (3) were obtained.

[0848]15 g of a compound (3) and 5 g of a compound (4) were dissolved in 200 ml of ethanol, and the solution of 10 ml of acetic acid, and heating churning was carried out for 4 hours. After cooling reaction liquid, 10 ml of concentrated hydrochloric acid was added. After keeping it in a refrigerator one whole day and night, the generated sediment was filtered and 8g of compounds (5) were obtained.

[0849]3.1 g of illustration compound D2-5-8 was obtained by making 5 g of a compound (5) react to 3.5 g of phenylboronic acid (6) under existence of potassium carbonate and a palladium catalyst in the solvent of a two-layer system which consists of 5 ml of 60 ml of tetrahydro franc-water. It checked that it was an object with NMR (nuclear magnetic resonance spectrum) and a mass spectrum.

[0850]

[Chemical formula 502]



[0851]The compound denoted by general formula (D3-1) - (D3-6) is explained.

[0852]In the general formula (D3-1), among the formula,  $A_1$  and  $A_2$  are bases chosen from the partial structure denoted by (G) from a general formula (A), may be the same or may differ.  $B_0$  is a connection machine of the 2 values which have at least seven or more carbon atoms. In a general formula (A), any one in  $B_1$  and  $B_2$  is equivalent to  $B_0$ , and others are the substituents of 1 value.  $n_1$  is an integer of 0 to 4. In a general formula (B), any one in  $B_3$  and  $B_4$  is equivalent to  $B_0$ , and others are the substituents of 1 value.  $n_2$  is an integer of 0 to 3. In a general formula (C), any one in  $B_5$  and  $B_6$  is equivalent to  $B_0$ , and others are the substituents of 1 value.  $n_3$  is an integer of 0 to 3. In a general formula (D), any one in  $B_7$  and  $B_8$  is equivalent to  $B_0$ , and others are the substituents of 1 value.  $n_4$  is an integer of 0 to 2. In a general formula (E), any one in  $B_9$  and  $B_{10}$  is equivalent to  $B_0$ , and others are the substituents of 1 value.  $n_5$  is an integer of 0 to 2. In a general formula (F), either  $B_{11}$  or  $B_{12}$  is equivalent to  $B_0$ , and one side is a substituent of 1 value. In a general formula (G), either  $B_{13}$  or  $B_{14}$  is equivalent to  $B_0$ , and one side is a substituent of 1 value. In general formula (A) - (E), the substituent of 1 value is condensed mutually, respectively and does not form a ring.

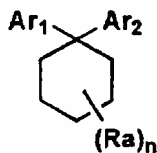
[0853]General formula (A) As for  $B_2$ ,  $B_4$ ,  $B_6$ ,  $B_8$ ,  $B_{10}$ ,  $B_{12}$ , and  $B_{14}$ , in - (G), it is preferred respectively that it is  $B_0$ .

[0854]The compound denoted by general formula (D3-1) - (D3-6) of this invention is explained.  $X_{11}$ ,  $X_{12}$ ,  $X_{13}$ ,  $X_{14}$ , and  $X_{15}$  express the basis of 2 values among a formula, and  $X_{11}$  and  $X_{12}$  have at least 13 or more carbon atoms. Also as for  $X_{13}$ ,  $X_{14}$ , and  $X_{15}$ , what has at least 13 or more carbon atoms is preferred. Specifically, an alkylene machine, the Ally Wren machine, a complex Ally Wren machine, an oxygen atom, sulfur atoms, such combination, etc. are mentioned. Preferably, the Ally Wren machine, connection machine (i), or (ii) can be mentioned.

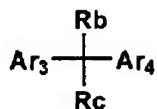
[0855]

[Chemical formula 503]

連結基(i)



連結基(ii)



[0856]In connection machine (i) and (ii),  $Ar_1$ ,  $Ar_2$ ,  $Ar_3$ , and  $Ar_4$  express the Ally Wren machine.  $Ra$ ,  $Rb$ , and  $Rc$  express an alkyl group.  $n$  expresses the integer of 0-10. In connection machine (i) and (ii), the parts to connect are  $Ar_1$ ,  $Ar_2$  and  $Ar_3$ , and  $Ar_4$ .

[0857]In general formula (D3-1) - (D3-6),  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$ ,  $R_{15}$ ,  $R_{16}$ ,  $R_{17}$ ,  $R_{18}$ ,  $R_{21}$ ,  $R_{22}$ ,  $R_{23}$ ,  $R_{24}$ ,  $R_{25}$ ,  $R_{26}$ ,  $R_{31}$ ,  $R_{32}$ ,  $R_{33}$ ,  $R_{34}$ ,  $R_{35}$ ,  $R_{36}$ ,  $R_{41}$ ,  $R_{42}$ ,  $R_{43}$ ,  $R_{44}$ ,  $R_{51}$ ,  $R_{52}$ ,  $R_{53}$ , or  $R_{54}$  expresses a hydrogen atom or a substituent respectively independently.

[0858]However,  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$ ,  $R_{15}$ ,  $R_{16}$ ,  $R_{17}$ , and  $R_{18}$  are condensed mutually, respectively, and do not form a ring.  $R_{21}$ - $R_{26}$ ,  $R_{31}$ - $R_{36}$ ,  $R_{41}$ - $R_{44}$  and  $R_{51}$  -  $R_{54}$  are also condensed mutually, respectively, and do not form a ring. [ as well as the following ]

[0859] $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$ ,  $R_{15}$ ,  $R_{16}$ ,  $R_{17}$ ,  $R_{18}$ ,  $R_{21}$ ,  $R_{22}$ ,  $R_{23}$ ,  $R_{24}$ ,  $R_{25}$ ,  $R_{26}$ ,  $R_{31}$ ,  $R_{32}$ ,  $R_{33}$ ,  $R_{34}$ , When  $R_{35}$ ,  $R_{36}$ ,  $R_{41}$ ,  $R_{42}$ ,  $R_{43}$ ,  $R_{44}$ ,  $R_{51}$ ,  $R_{52}$ ,  $R_{53}$ , or  $R_{54}$  expresses a substituent, [ as the substituent ] an alkyl group (for example, a methyl group, an ethyl group, an isopropyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, a perfluoro propyl group, A perfluoro n-butyl group, a perfluoro t-butyl group, t-butyl group, etc., A cycloalkyl machine (for example, a cyclopentyl group, a cyclohexyl group, etc.), aralkyl groups (for example, a benzyl group, 2-FENECHIRU machine, etc.) and an aryl group (for example, a phenyl group.) alkoxy groups (for example, an ethoxy basis.), such as a naphthyl

group, p-trill machine, and p-chlorophenyl machine Aryloxy groups (for example, phenoxy group etc.), such as an isopropoxy group and a butoxy machine, a cyano group, a hydroxyl group, halogen atoms (a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc.), etc. are mentioned. These bases may be replaced further.

[0860]In a general formula (D3-2), at least two of  $R_{11}$ ,  $R_{14}$ ,  $R_{15}$ , and  $R_{18}$  have a preferred case where it is an aryl group. In a general formula (3), at least two of  $R_{21}$ ,  $R_{23}$ ,  $R_{24}$ , and  $R_{26}$  have a preferred case where it is an aryl group.

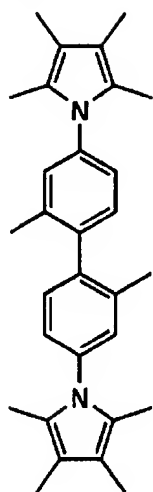
[0861] $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$ ,  $R_{15}$ ,  $R_{16}$ ,  $R_{17}$ ,  $R_{18}$ ,  $R_{21}$ ,  $R_{22}$ ,  $R_{23}$ ,  $R_{24}$ ,  $R_{25}$ ,  $R_{26}$ ,  $R_{31}$ ,  $R_{32}$ ,  $R_{33}$ ,  $R_{34}$ , When  $R_{35}$ ,  $R_{36}$ ,  $R_{41}$ ,  $R_{42}$ ,  $R_{43}$ ,  $R_{44}$ ,  $R_{51}$ ,  $R_{52}$ ,  $R_{53}$ , or  $R_{54}$  expresses a substituent, they are an alkyl group or an aryl group preferably.

[0862]Although the example of a compound denoted by general formula (D3-1) - (D3-6) of this invention below is shown, it is not limited to these.

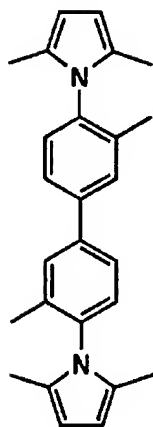
[0863]

[Chemical formula 504]

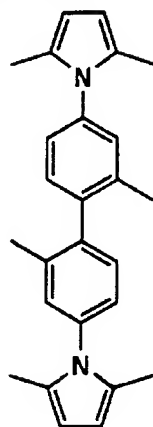
D3-1-1



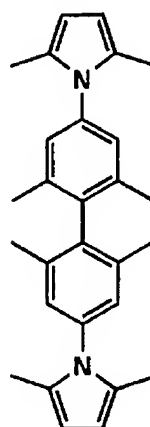
D3-1-2



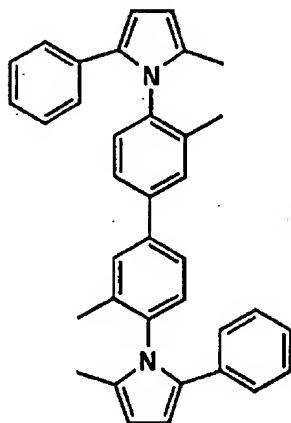
D3-1-3



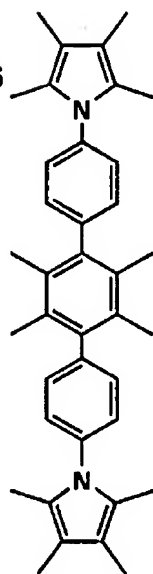
D3-1-4



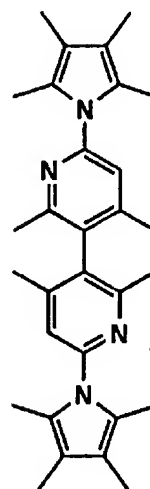
D3-1-5



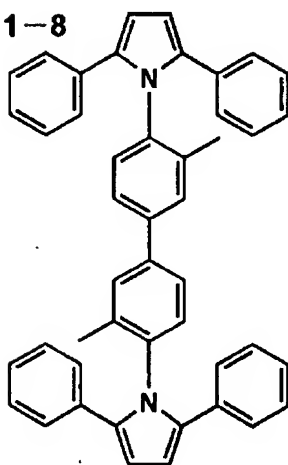
D3-1-6



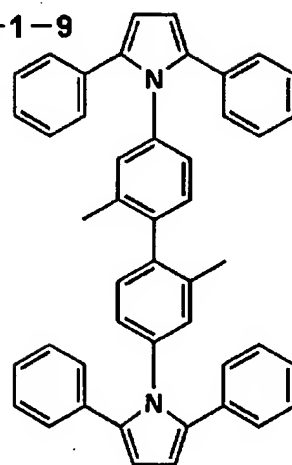
D3-1-7



D3-1-8



D3-1-9

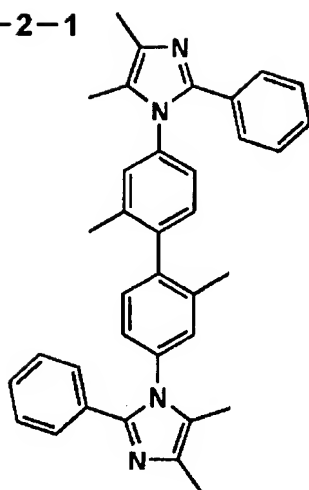




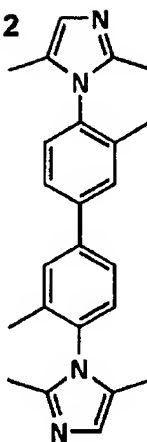
[0864]

[Chemical formula 505]

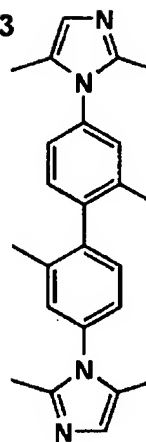
D3-2-1



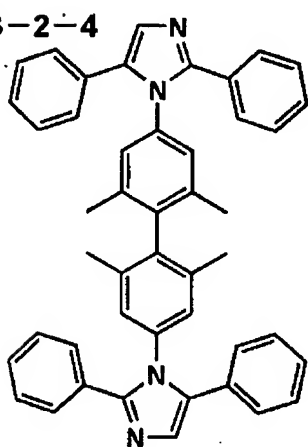
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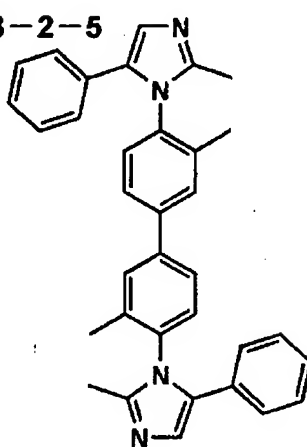
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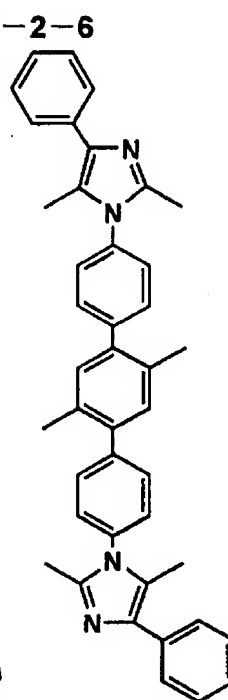
D3-2-4



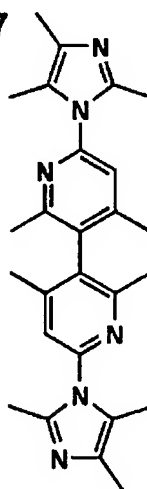
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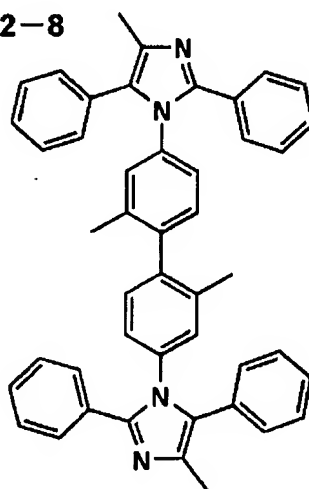
D3-2-6



D3-2-7



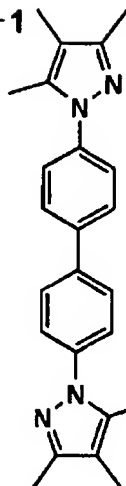
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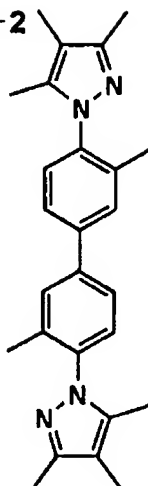
[0865]

[Chemical formula 506]

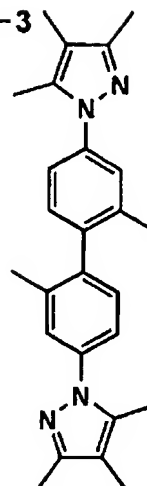
D3-3-1



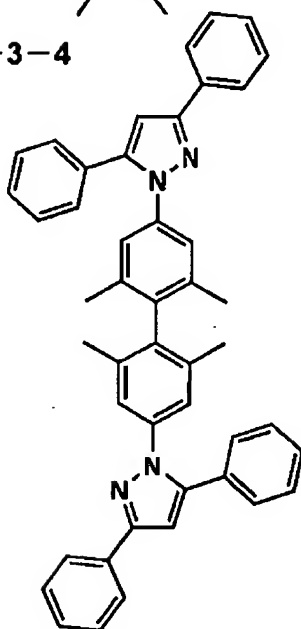
D3-3-2



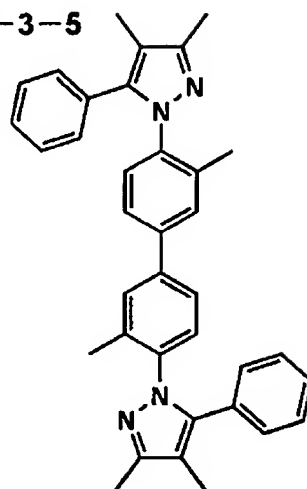
D3-3-3



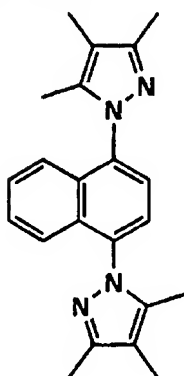
D3-3-4



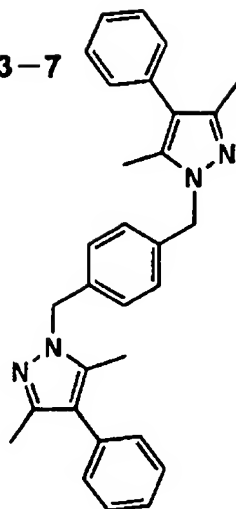
D3-3-5



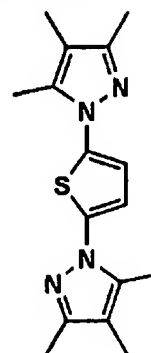
D3-3-6



D3-3-7

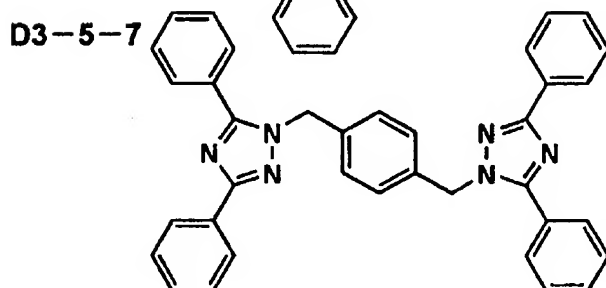
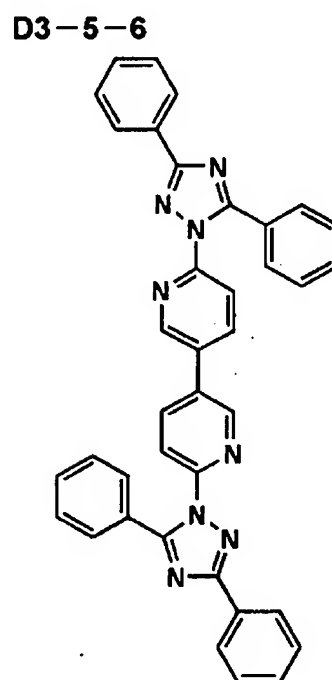
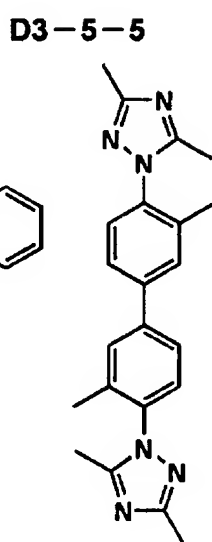
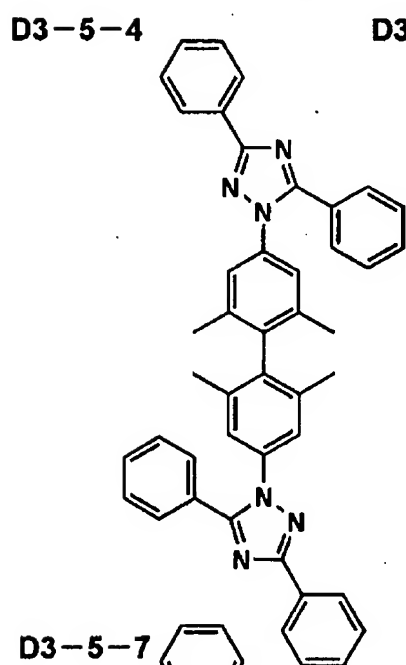
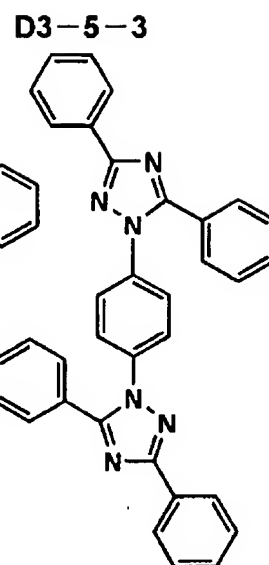
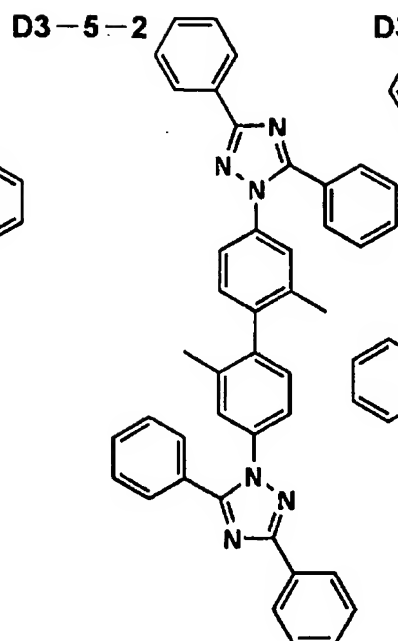
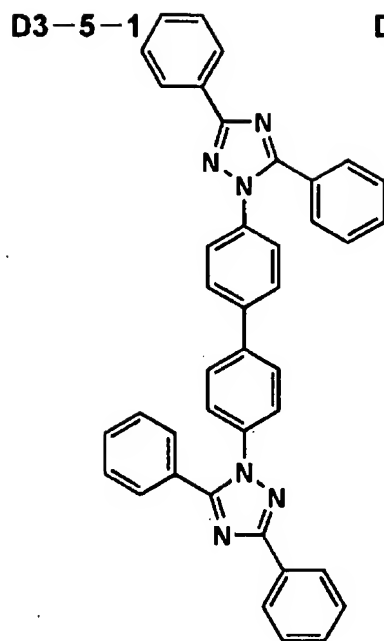


D3-3-8



[0866]

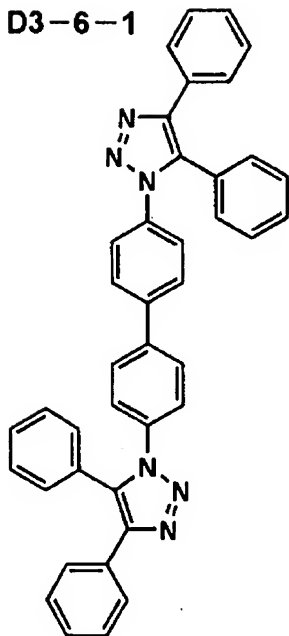
[Chemical formula 507]



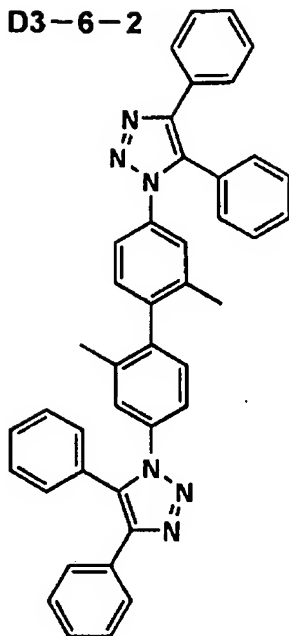
[0867]

[Chemical formula 508]

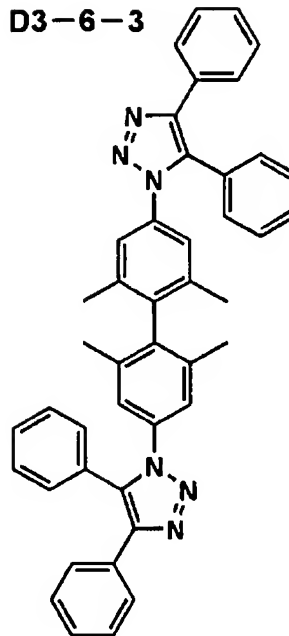
D3-6-1



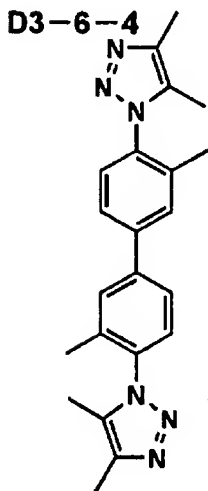
D3-6-2



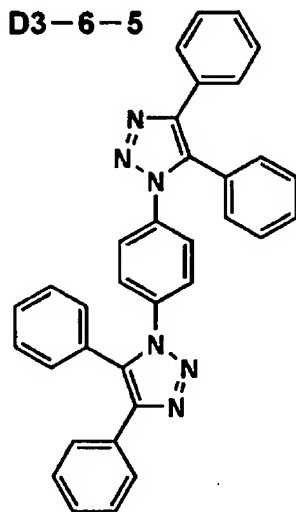
D3-6-3



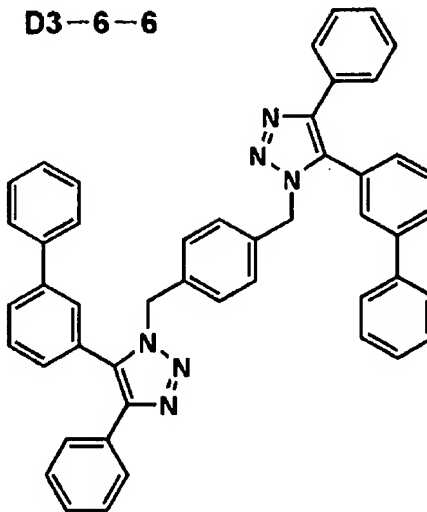
D3-6-4



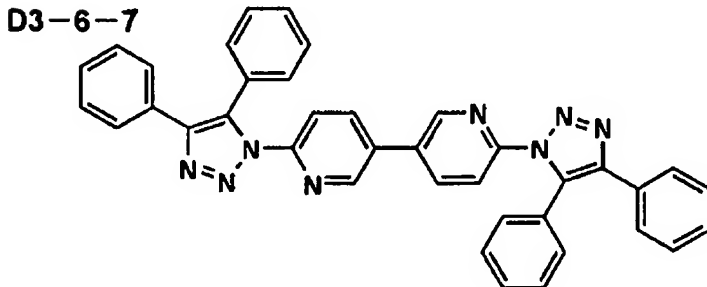
D3-6-5



D3-6-6



D3-6-7

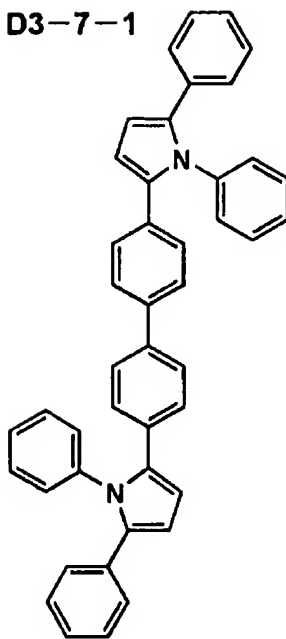




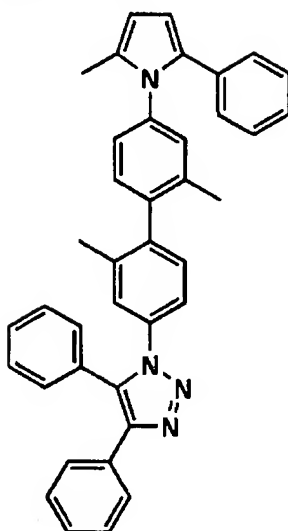
[0868]

[Chemical formula 509]

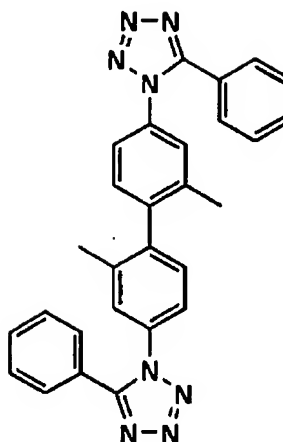
D3-7-1



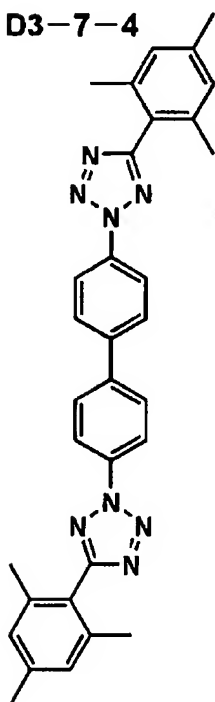
D3-7-2



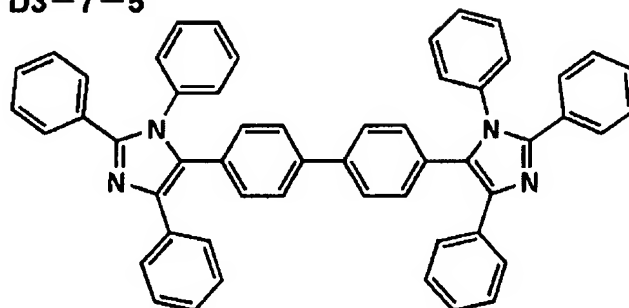
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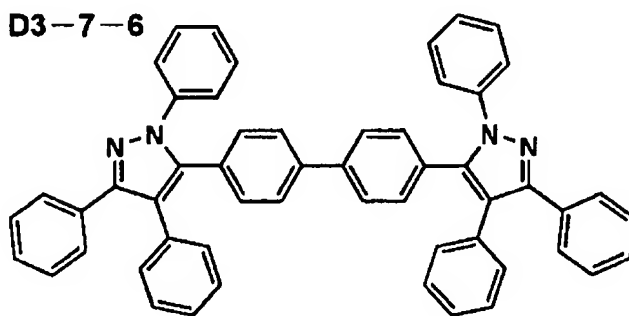
D3-7-4



D3-7-5



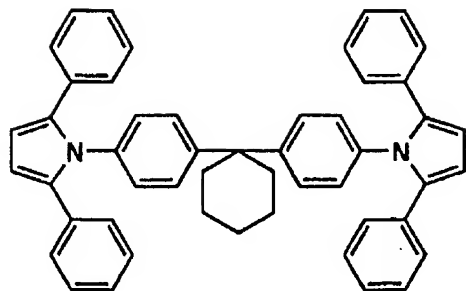
D3-7-6



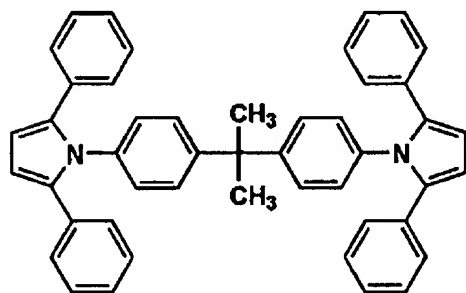
[0869]

[Chemical formula 510]

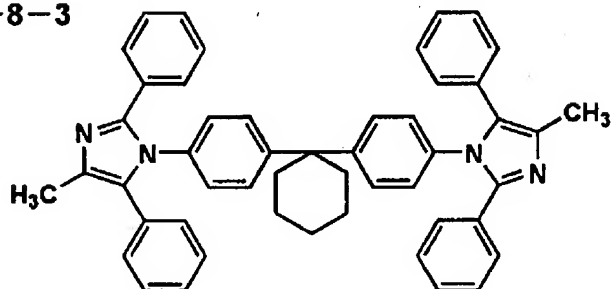
D3-8-1



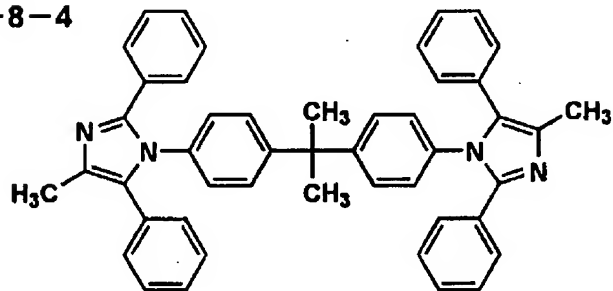
D3-8-2



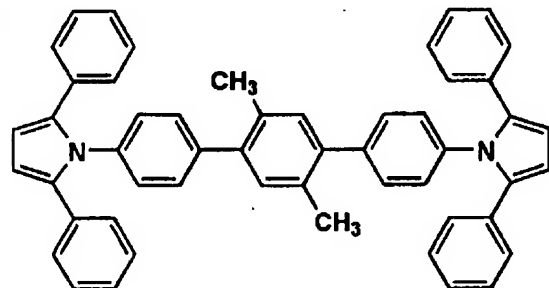
D3-8-3



D3-8-4



D3-8-5



[0870]The example of typical manufacture of the compound of this invention is shown below. It can manufacture by a method with the same said of other compounds.

[0871](Synthetic example) The synthetic alt. tolidine 5.0g and 2 of a compound (D3-1-2) and 5.0 g of 5 hexane dione were dissolved in 50 ml of acetic acid, and heating churning was carried out for 3 hours. After the end of a reaction, ethyl acetate and water were added to reaction liquid, and the organic layer was extracted. After carrying out decompression distilling off of the solvent after dryness with magnesium sulfate and refining by column chromatography, it re-crystallized by acetonitrile and 6.9g of compounds (D3-1-2) were obtained (80% of \*\*\*\*).

[0872]It checked that it was a compound (D3-1-2) with the NMR spectrum and the mass spectrum.

[0873](Synthetic example) In the example 1 of synthetic composition of a compound (D3-1-8), the compound (1-8) was compounded in conformity with the synthetic example 1 except having changed 2 and 5 hexane dione into 1 and 2 dibenzo IRUETAN.

[0874]It checked that it was a compound (1-8) with the NMR spectrum and the mass spectrum.

[0875](Synthetic example) Heating flowing back of 20 g of synthetic cyclohexanone and 38 g of aniline of a compound (D3-8-1) was carried out in concentrated hydrochloric acid for 40 hours. After neutralizing reaction liquid, ethyl acetate and water were added to reaction liquid, and the organic layer was extracted. After carrying out decompression distilling off of the solvent after dryness with magnesium sulfate, it refined by column chromatography and 31g of amine compounds were obtained. This amine compound, and 1 and 2 dibenzo IRUETAN were compounded in conformity with the synthetic example 2, and the compound (D3-8-1) was obtained.

[0876]It checked that it was a compound (D3-8-1) with the NMR spectrum and the mass spectrum.

[0877]The compound denoted by the general formula (E1-1) of this invention and (E1-5) below is explained in detail.

[0878]Among said general formula (E1-1),  $X_1 - X_{12}$  express a hydrogen atom or a substituent, it may differ respectively, or may be the same and at least one of  $X_1$ ,  $X_4$ ,  $X_5$ ,  $X_8$ ,  $X_9$ , and  $X_{12}$  expresses a substituent. Alkyl groups (methyl, ethyl, i-propyl, hydroxyethyl, methoxymethyl, trifluoromethyl, t-butyl, etc.), halogen atoms (fluoride, chlorine, etc.), and alkoxy groups (methoxy and ethoxy <sup>\*\*i-propoxy</sup>, butoxy, etc.) are mentioned preferably as a substituent.  $A_1 - A_3$  express the aromatic hydrocarbon machine which is not replaced [ substitution or ], they may differ respectively, or may be the same and express a phenyl, biphenyl, Naff Chill, binaphthyl, a phenan thrill, etc. preferably.

[0879] $X_1$ ,  $X_5$ , and  $X_9$  express a substituent preferably among said general formula (E1-1). Alkyl groups (methyl, ethyl, i-propyl, hydroxyethyl, methoxymethyl, trifluoromethyl, t-butyl, etc.), halogen atoms (fluoride, chlorine, etc.), and alkoxy groups (methoxy and ethoxy <sup>\*\*i-propoxy</sup>, butoxy, etc.) are mentioned preferably as a substituent.

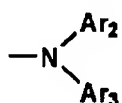
[0880]The inside of said general formula (E1-1) however  $X_1$ ,  $X_4$ ,  $X_5$ , [ the total value of an each solid parameter  $Es_{X_1}$  / of  $X_8$ ,  $X_9$ , and  $X_{12}$  /,  $Es_{X_4}$ ,  $Es_{X_5}$ ,  $Es_{X_8}$ ,  $Es_{X_9}$ , and  $Es_{X_{12}}$  value ] What fills  $Es_{X_1} + Es_{X_4} + Es_{X_5} + Es_{X_8} + Es_{X_9} + Es_{X_{12}} \leq -1.3$  is preferred.

[0881] $A_1 - A_3$  may express the basis denoted by the following general formula (E1-2), and may differ from each other respectively, or may be the same.

[0882]

[Chemical formula 511]

一般式(E1-2)



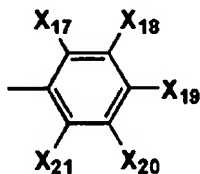
[0883]Among a formula,  $\text{Ar}_2$  and  $\text{Ar}_3$  express the aromatic hydrocarbon machine which is not replaced [ substitution or ], they may differ respectively, or may be the same and express preferably the phenyl group which is not replaced [ substitution or ].

[0884]Preferably,  $\text{Ar}_2$  and  $\text{Ar}_3$  in a general formula (E1-2) may express the basis denoted by the following general formula (E1-3), and may differ from each other respectively, or that of  $\text{A}_1$  -  $\text{A}_3$  may be the same again.

[0885]

[Chemical formula 512]

一般式(E1-3)



[0886] $X_{17} - X_{21}$  express a hydrogen atom or a substituent among a general formula (E1-3), and as substitution preferably, Alkyl groups (methyl, ethyl, i-propyl, hydroxyethyl, methoxymethyl, trifluoromethyl, t-butyl, etc.), halogen atoms (fluoride, chlorine, etc.), and alkoxy groups (methoxy and ethoxy <sup>\*\*</sup>i-propoxy, butoxy, etc.) are mentioned.

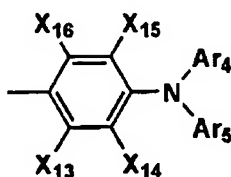
[0887]Among said general formula (E1-1),  $X_1 - X_{12}$  express a hydrogen atom or a substituent, it may differ respectively, or may be the same and at least one of  $X_1, X_4, X_5, X_8, X_9$ , and  $X_{12}$  expresses a substituent. Alkyl groups (methyl, ethyl, i-propyl, hydroxyethyl, methoxymethyl, trifluoromethyl, t-butyl, etc.), halogen atoms (fluoride, chlorine, etc.), and alkoxy groups (methoxy and ethoxy <sup>\*\*</sup>i-propoxy, butoxy, etc.) are mentioned preferably as a substituent.

[0888]Preferably,  $A_1$  of said general formula (E1-1) -  $A_3$  may express the basis denoted by the following general formula (E1-4), and may differ from each other respectively, or may be the same again.

[0889]

[Chemical formula 513]

一般式(E1-4)



[0890]Among a formula,  $Ar_4$  and  $Ar_5$  may express the aromatic hydrocarbon machine which is



not replaced [ substitution or ], and may differ from each other respectively, or may be the same.  $X_{13} - X_{16}$  may express a hydrogen atom or a substituent, and may differ from each other respectively, or may be the same. Alkyl groups (methyl, ethyl, i-propyl, hydroxyethyl, methoxymethyl, trifluoromethyl, t-butyl, etc.), halogen atoms (fluoride, chlorine, etc.), and alkoxy groups (methoxy and ethoxy \*\*i-propoxy, butoxy, etc.) are mentioned preferably as a substituent.  $Ar_4$  and  $Ar_5$  express the aromatic hydrocarbon machine which is not replaced [ substitution or ], they may differ respectively, or may be the same and express a phenyl group preferably.

[0891]Among said general formula (E1-1),  $X_1 - X_{12}$  express a hydrogen atom or a substituent, it may differ respectively, or may be the same and  $X_1$ ,  $X_5$ , and  $X_9$  express a substituent. Alkyl groups (methyl, ethyl, i-propyl, hydroxyethyl, methoxymethyl, trifluoromethyl, t-butyl, etc.), halogen atoms (fluoride, chlorine, etc.), and alkoxy groups (methoxy and ethoxy \*\*i-propoxy, butoxy, etc.) are mentioned preferably as a substituent.  $A_1 - A_3$  may express the basis denoted by said general formula (4), and may differ from each other respectively, or may be the same.

[0892]Among said general formula (E1-1),  $X_1 - X_{12}$  may express a hydrogen atom or a substituent, and may differ from each other respectively, or may be the same. However, each solid parameter  $Es_{X_1}$  of  $X_1$ ,  $X_4$ ,  $X_5$ ,  $X_8$ ,  $X_9$ , and  $X_{12}$ , The total value of an  $Es_{X_4}$ ,  $Es_{X_5}$ ,  $Es_{X_8}$ ,  $Es_{X_9}$ , and  $Es_{X_{12}}$  value fills  $Es_{X_1} + Es_{X_4} + Es_{X_5} + Es_{X_8} + Es_{X_9} + Es_{X_{12}} \leq -1.3$ .  $A_1 - A_3$  may express the basis denoted by said general formula (4), and may differ from each other respectively, or may be the same.

[0893]Among a general formula (E1-5),  $X_{27} - X_{38}$  may express a hydrogen atom or a substituent, and may differ from each other respectively, or may be the same. Alkyl groups (methyl, ethyl, i-propyl, hydroxyethyl, methoxymethyl, trifluoromethyl, t-butyl, etc.), halogen atoms (fluoride, chlorine, etc.), and alkoxy groups (methoxy and ethoxy \*\*i-propoxy, butoxy, etc.) are mentioned preferably as a substituent.  $Ar_6 - Ar_{11}$  express the aromatic hydrocarbon machine which is not replaced [ substitution or ], they may differ respectively, or may be the same and express preferably the phenyl group which is not replaced [ substitution or ].

[0894]As for  $\text{Ar}_6 - \text{Ar}_{11}$ , in the above-mentioned general formula (E1-5), what is denoted by a general formula (E1-3) is preferred.

[0895]Among a general formula (E1-3),  $\text{X}_{17} - \text{X}_{21}$  may express a hydrogen atom or a substituent, and may differ from each other respectively, or may be the same. Alkyl groups (methyl, ethyl, i-propyl, hydroxyethyl, methoxymethyl, trifluoromethyl, t-butyl, etc.), halogen atoms (fluoride, chlorine, etc.), and alkoxy groups (methoxy and ethoxy, i-propoxy, butoxy, etc.) are mentioned preferably as a substituent.

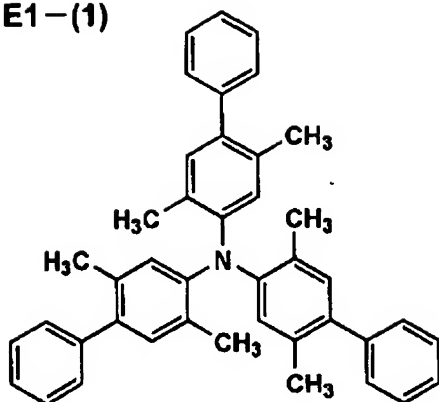
[0896]The synthetic method in particular of the aromatic amine compound shown by said general formula (E1-1) - (E1-5) is not limited. How to carry out Suzuki coupling of the boron acid of aromatic hydrocarbon equivalent to this, and compound it by the palladium catalyst and a base, after brominating bird phenylamine and obtaining a bromine substitution thing, After adding KI,  $\text{KIO}_3$ , and acetic acid to bird phenylamine and obtaining the iodine substitution thing to a phenyl group, After brominating the method and bird phenylamine which the secondary amine compound equivalent to this is made to react, and are compounded and obtaining a bromine substitution thing, the method of making the secondary amine equivalent to this react, and compounding is illustrated. It is compoundable about other things using this reaction.

[0897]Next, these typical compounds are illustrated.

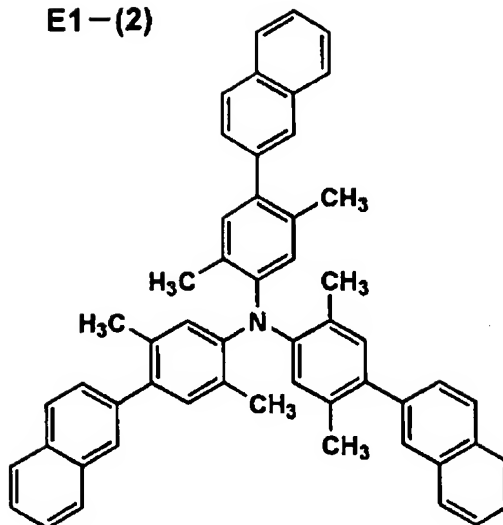
[0898]

[Chemical formula 514]

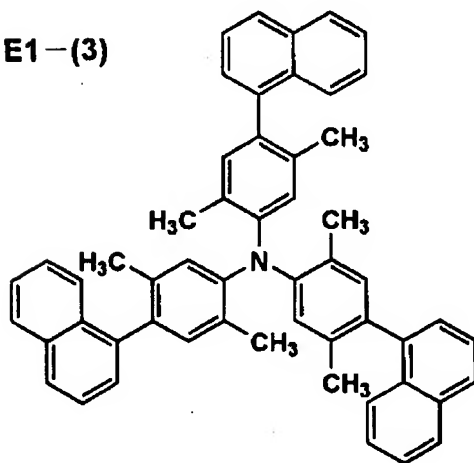
E1-(1)



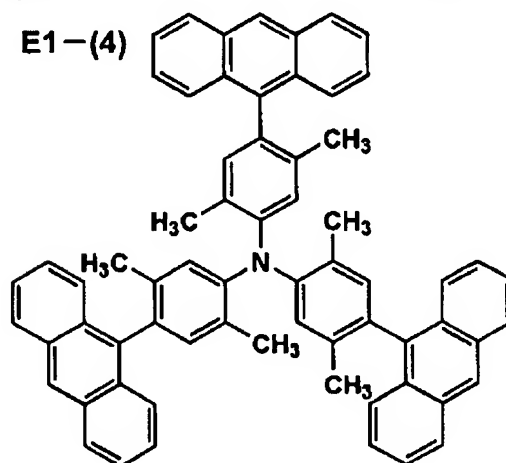
E1-(2)



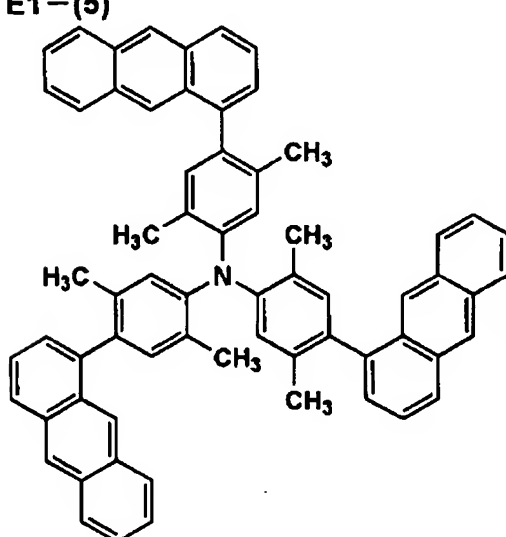
E1-(3)



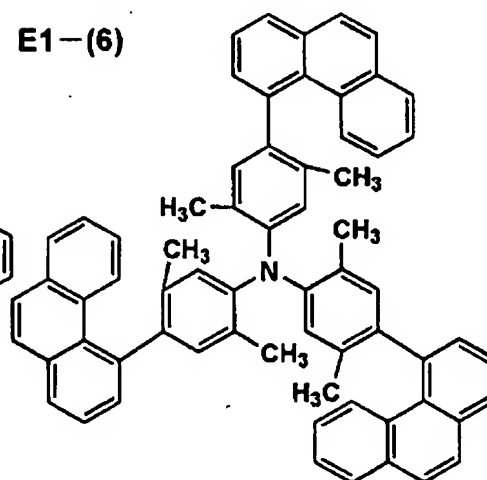
E1-(4)



E1-(5)



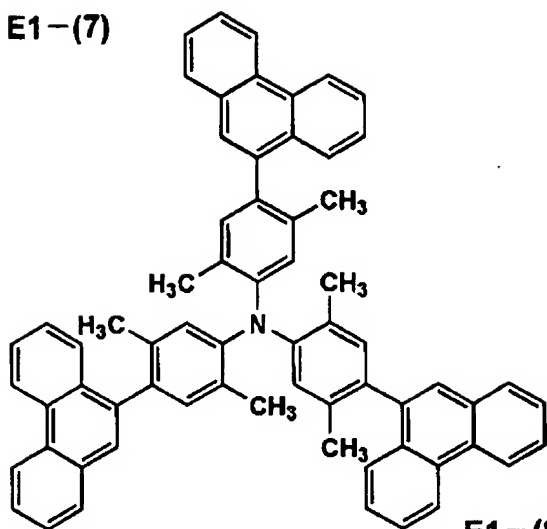
E1-(6)



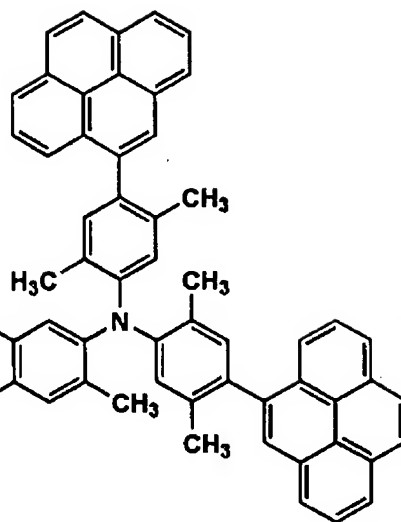
[0899]

[Chemical formula 515]

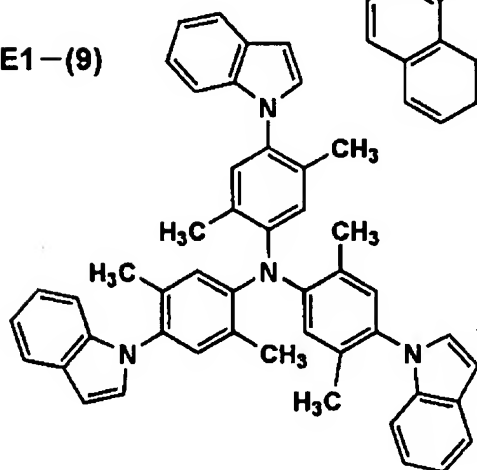
E1-(7)



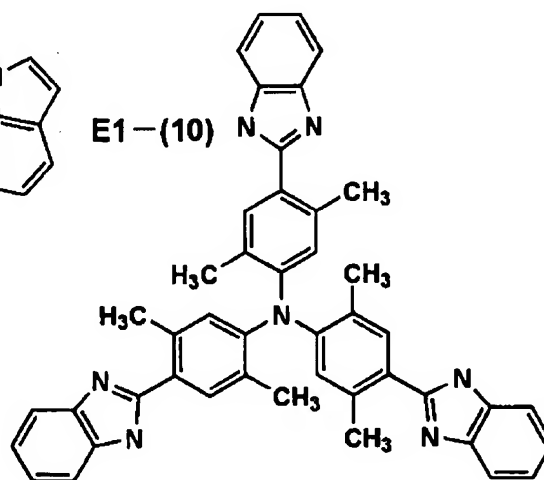
E1-(8)



E1-(9)



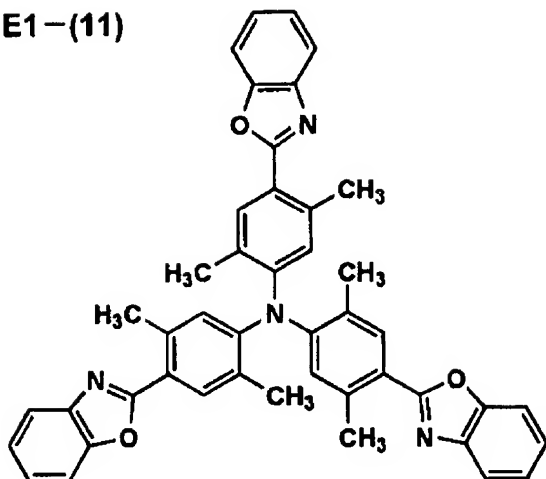
E1-(10)



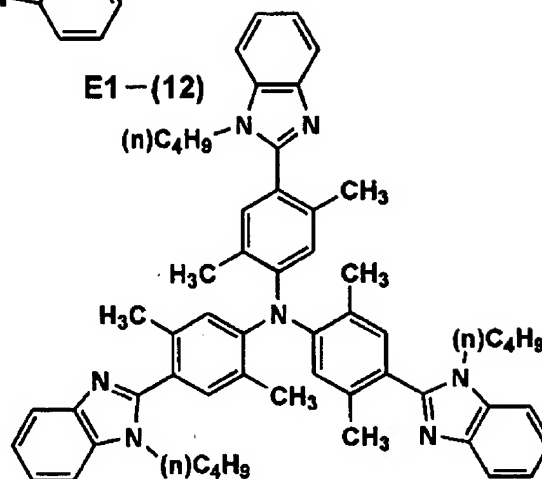
[0900]

[Chemical formula 516]

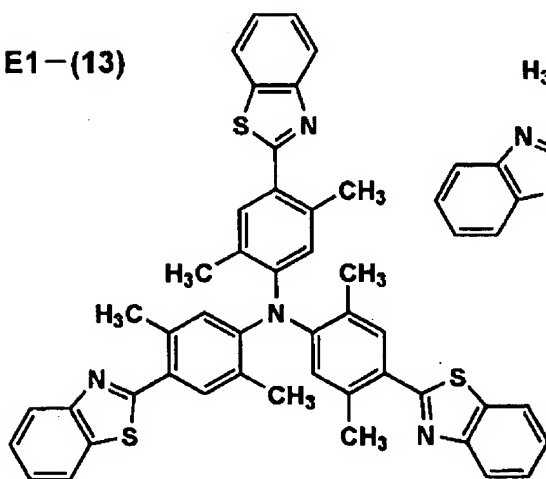
E1-(11)



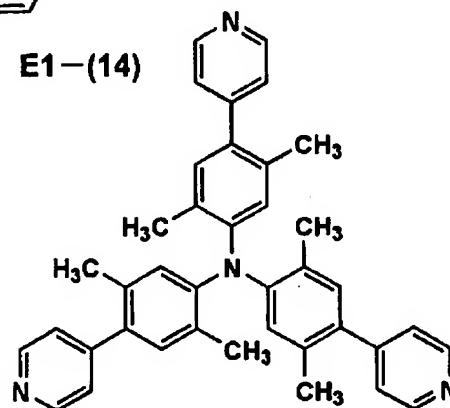
E1-(12)



E1-(13)



E1-(14)

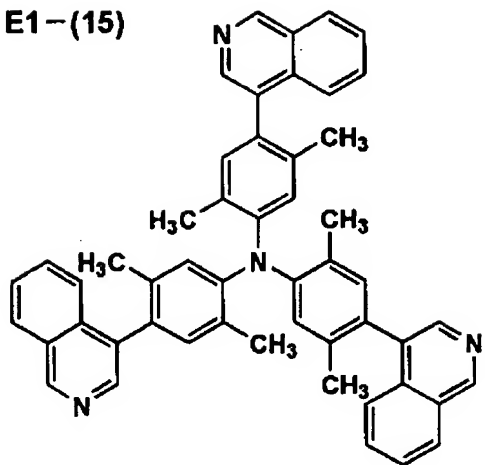




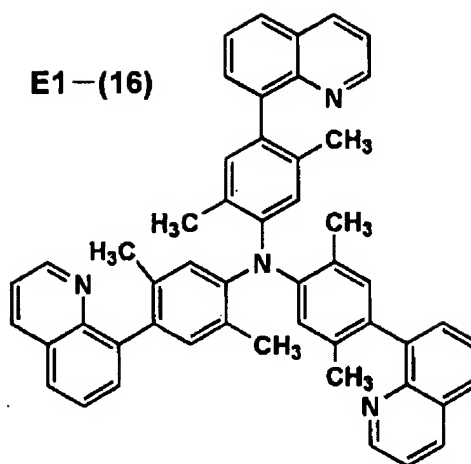
[0901]

[Chemical formula 517]

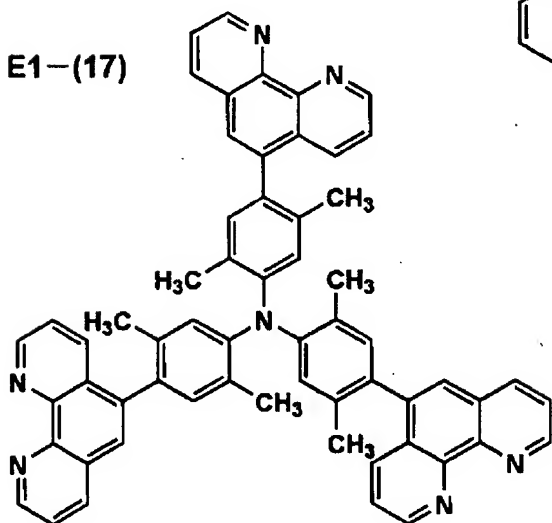
E1-(15)



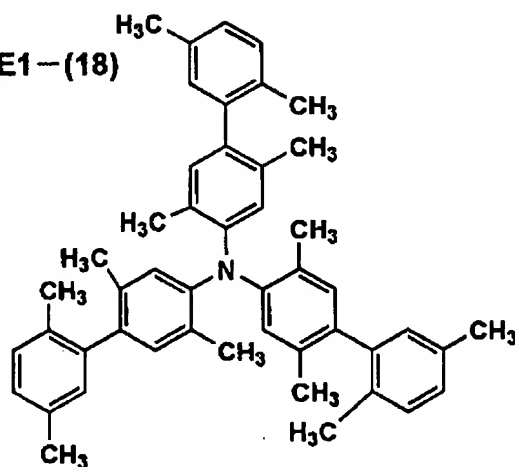
E1-(16)



E1-(17)



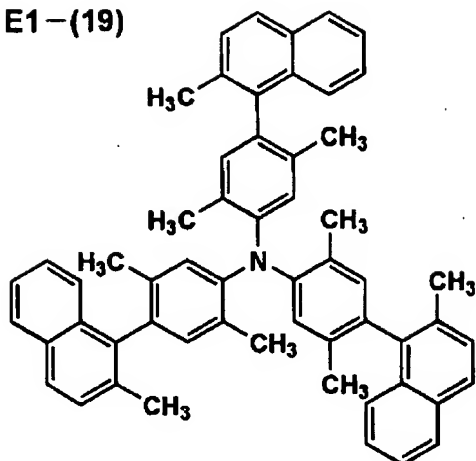
E1-(18)



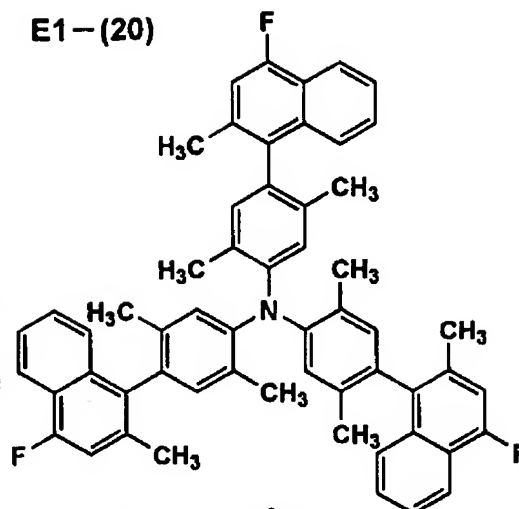
[0902]

[Chemical formula 518]

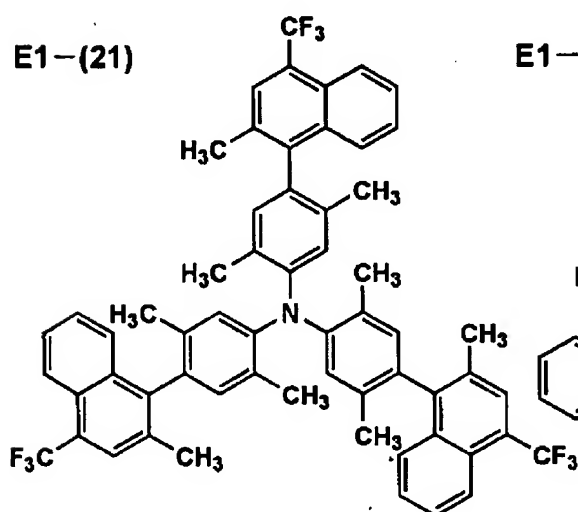
E1-(19)



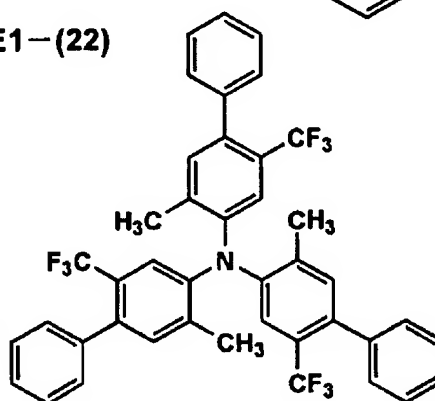
E1-(20)



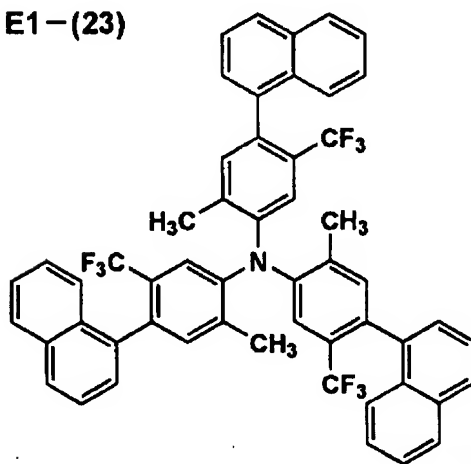
E1-(21)



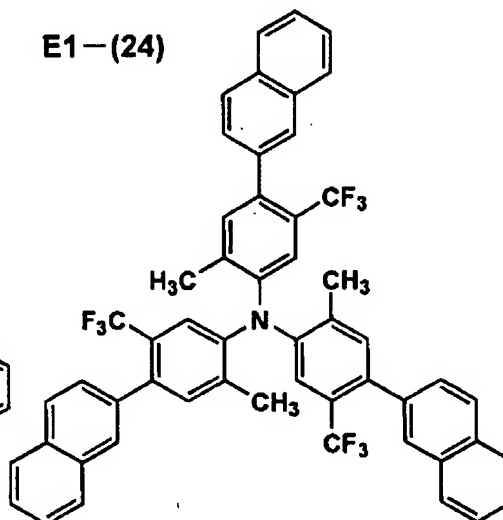
E1-(22)



E1-(23)



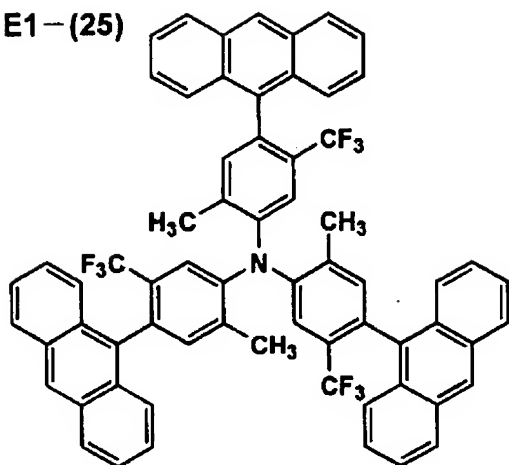
E1-(24)



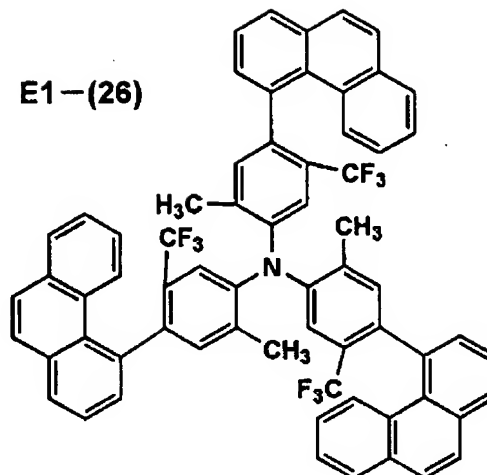
[0903]

[Chemical formula 519]

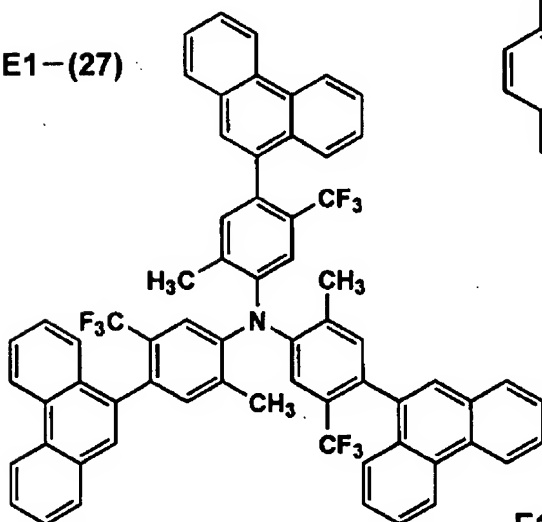
E1-(25)



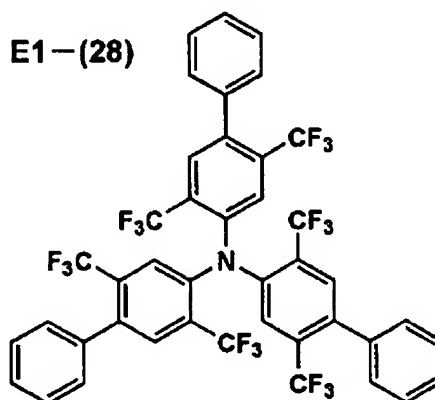
E1-(26)



E1-(27)



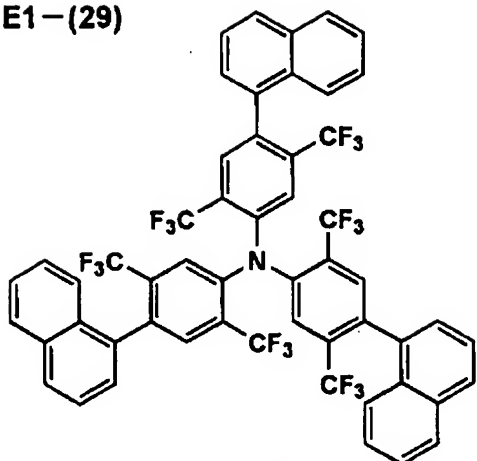
E1-(28)



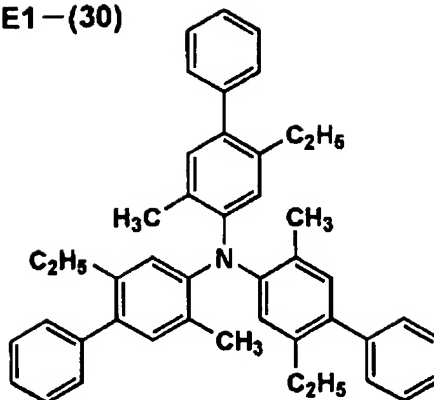
[0904]

[Chemical formula 520]

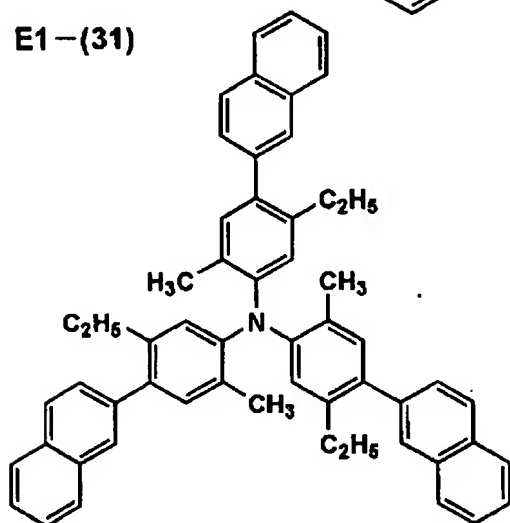
E1-(29)



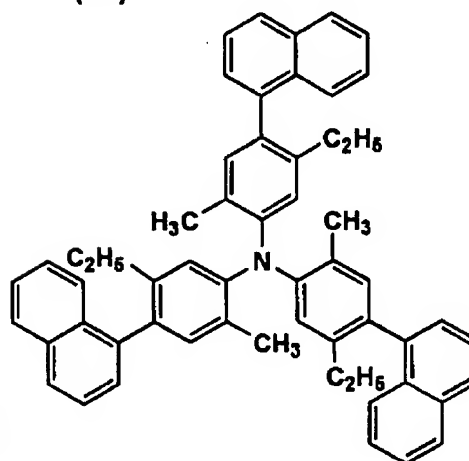
E1-(30)



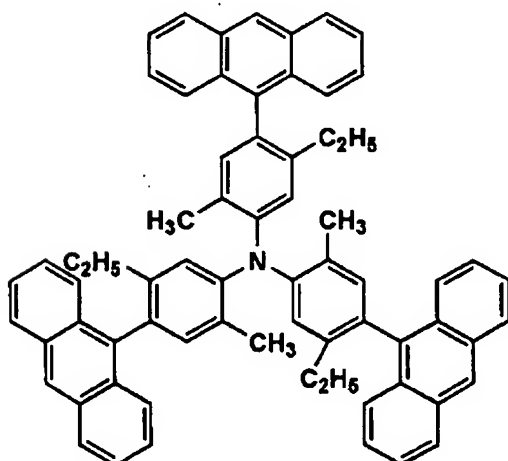
E1-(31)



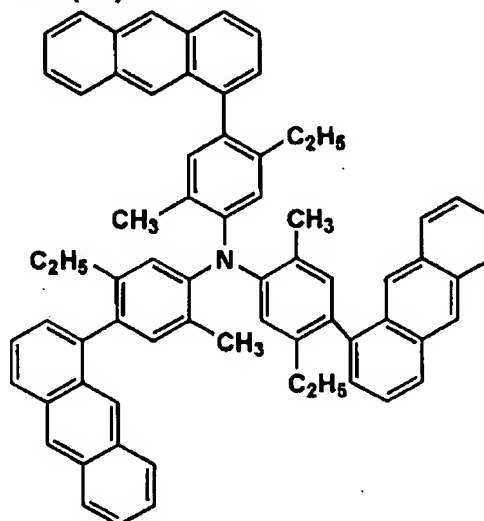
E1-(32)



E1-(33)



E1-(34)

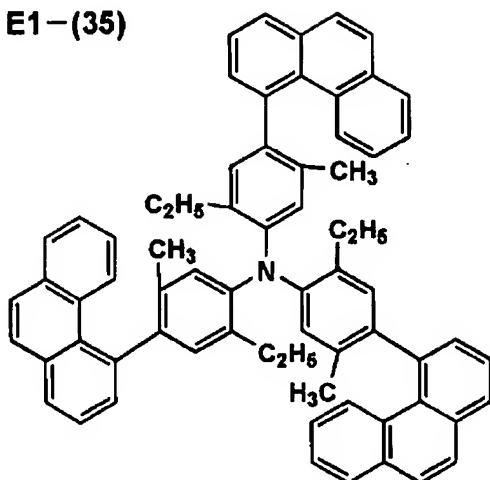




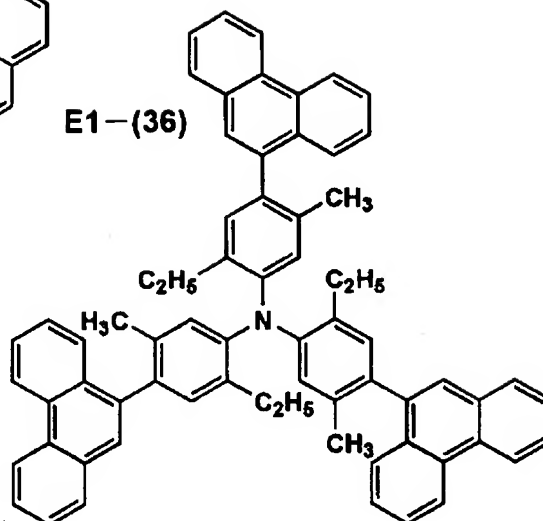
[0905]

[Chemical formula 521]

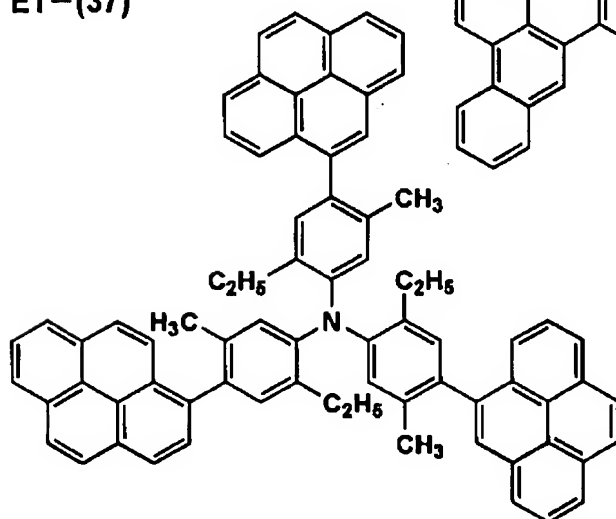
E1-(35)



E1-(36)



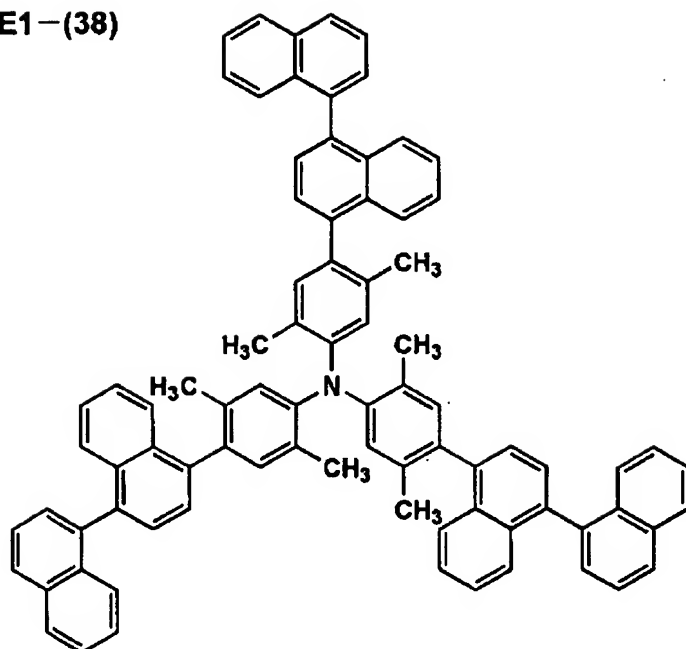
E1-(37)



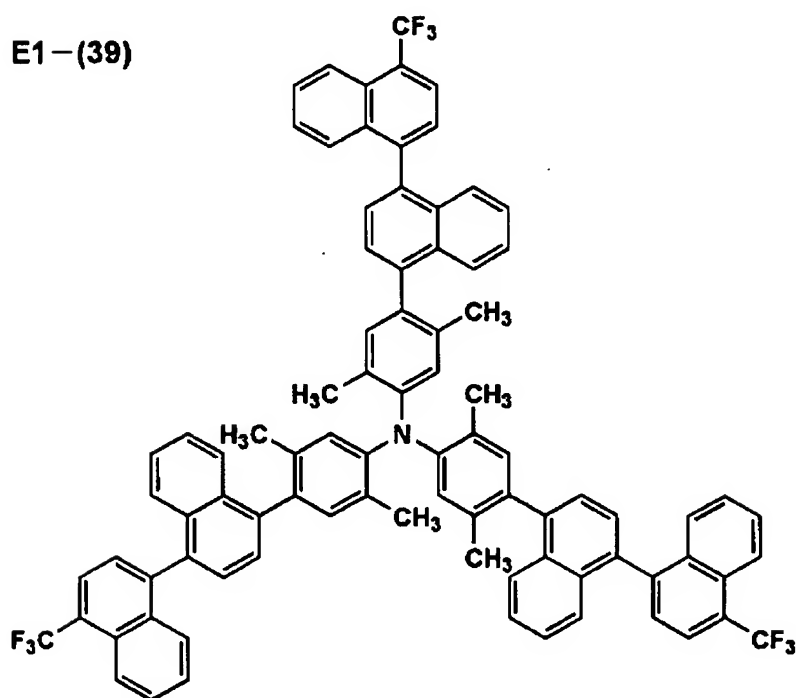
[0906]

[Chemical formula 522]

E1-(38)



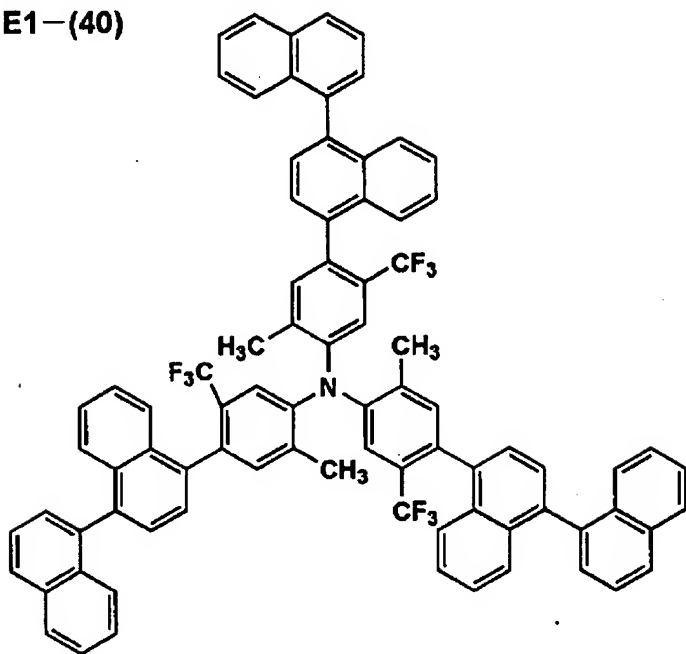
E1-(39)



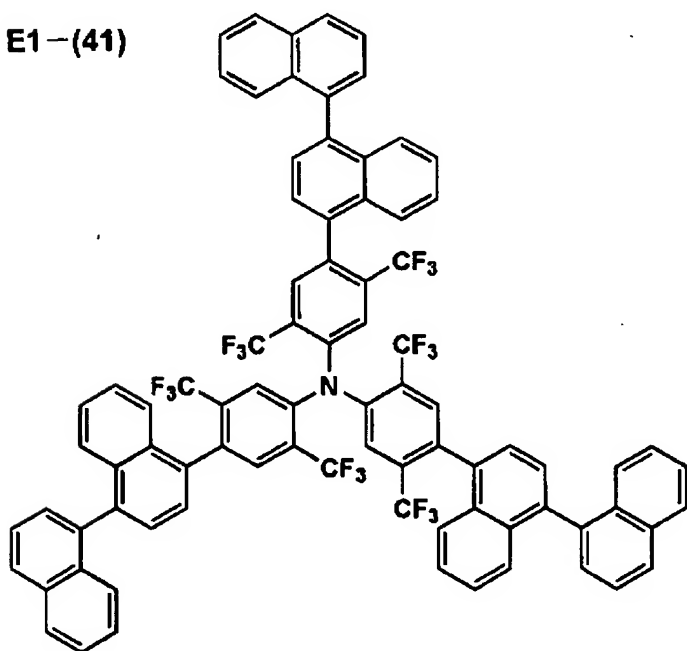
[0907]

[Chemical formula 523]

**E1-(40)**



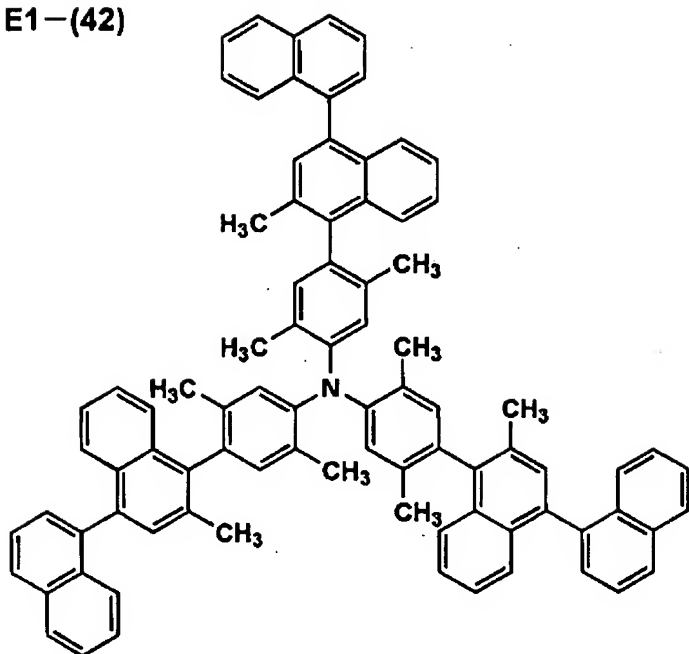
**E1-(41)**



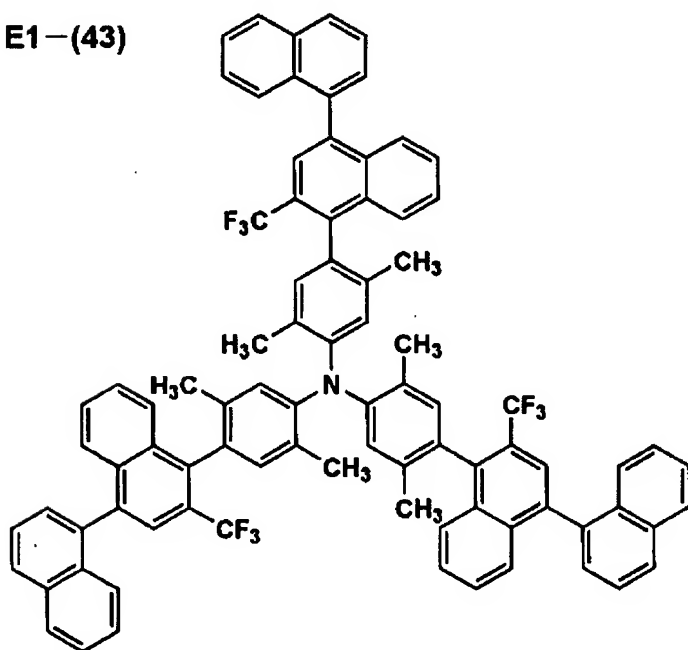
[0908]

[Chemical formula 524]

E1-(42)



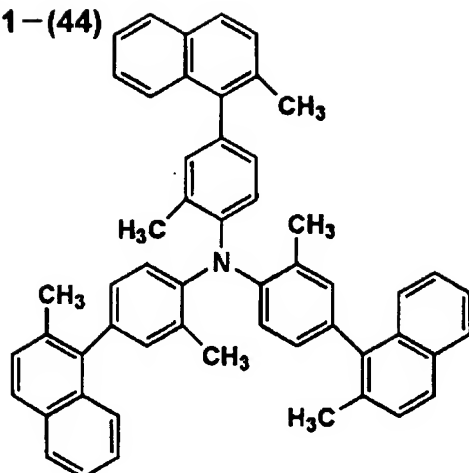
E1-(43)



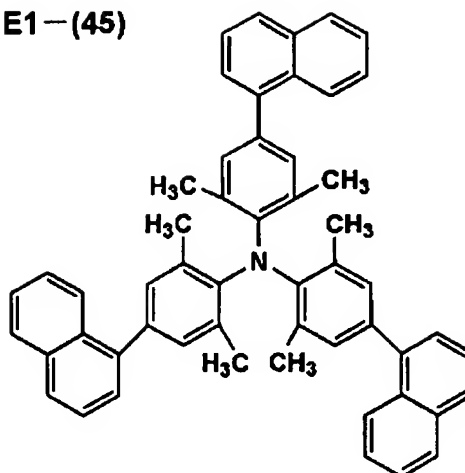
[0909]

[Chemical formula 525]

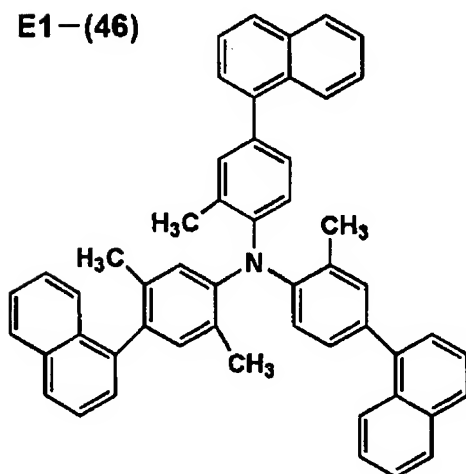
E1-(44)



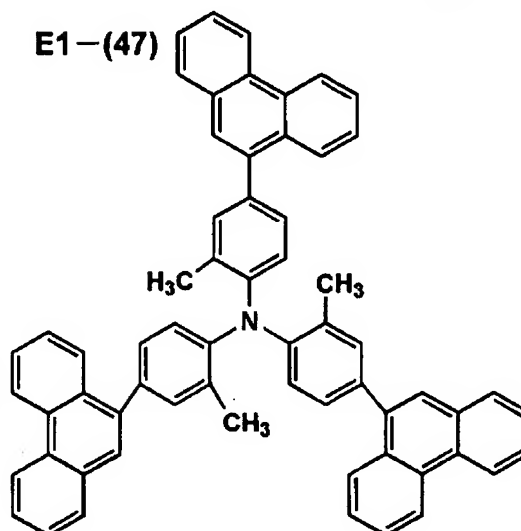
E1-(45)



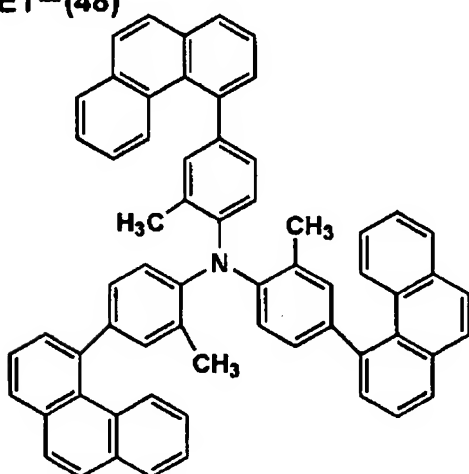
E1-(46)



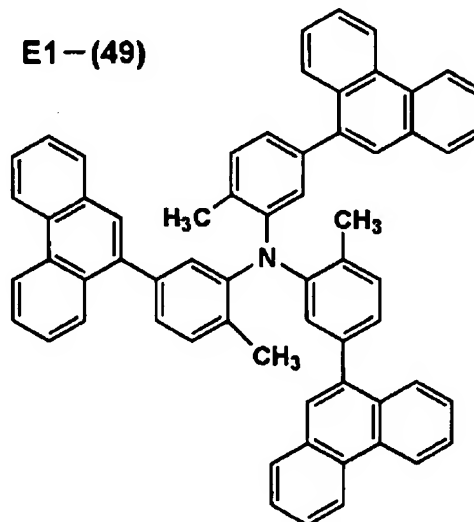
E1-(47)



E1-(48)



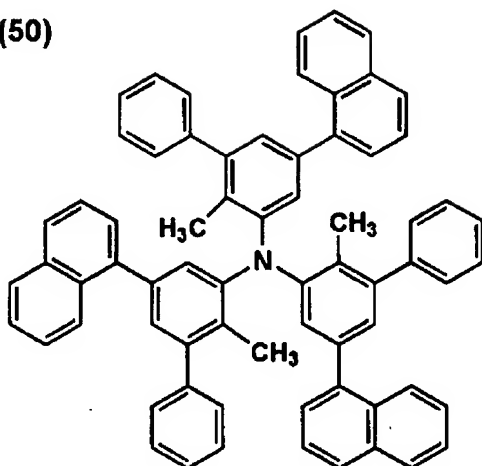
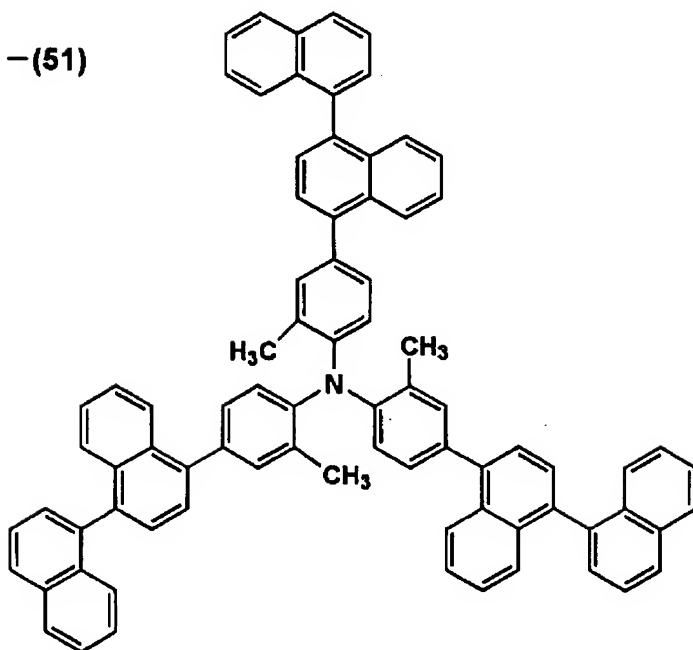
E1-(49)





[0910]

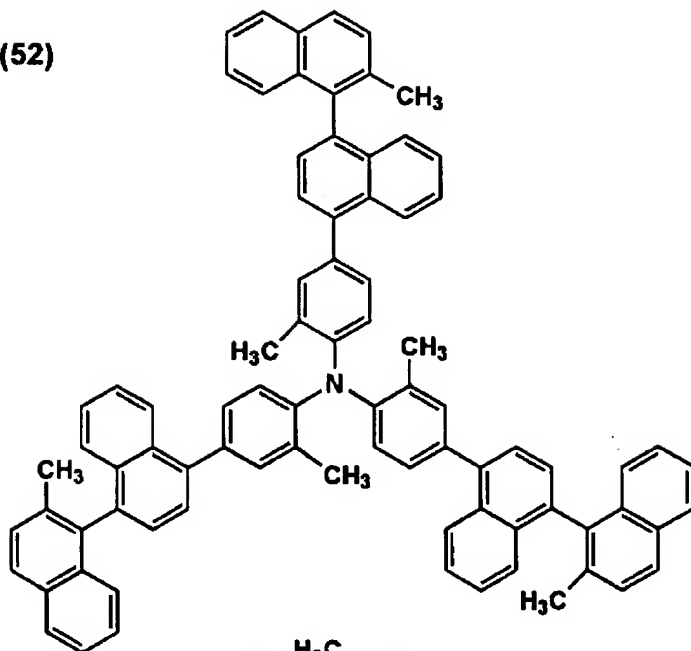
[Chemical formula 526]

**E1-(50)****E1-(51)**

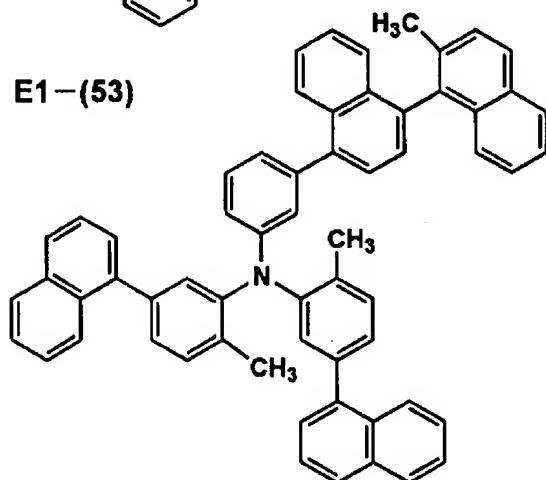
[0911]

[Chemical formula 527]

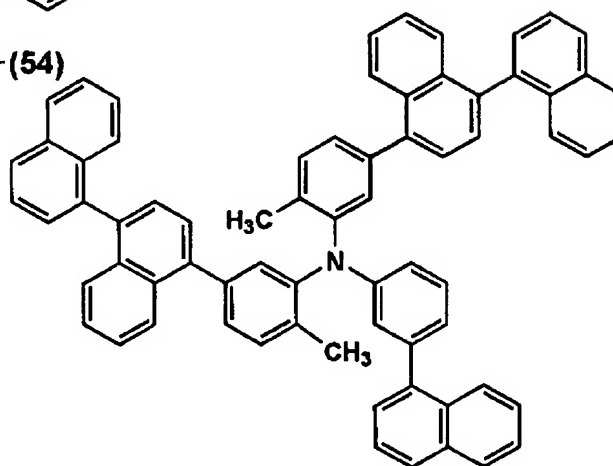
E1-(52)



E1-(53)



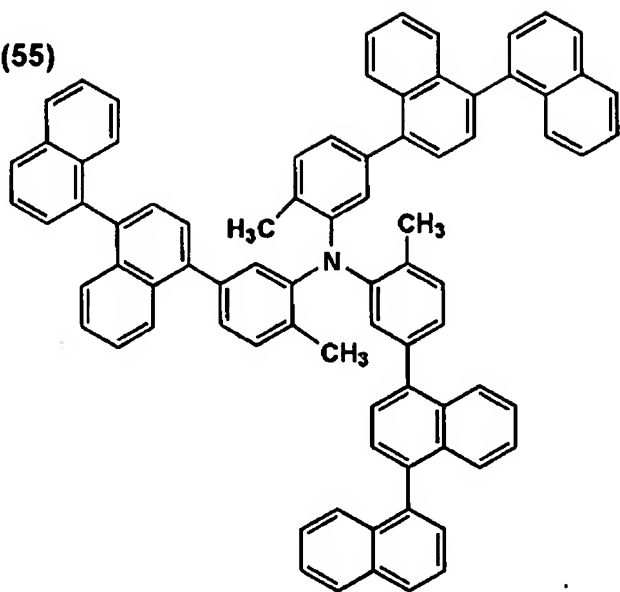
E1-(54)



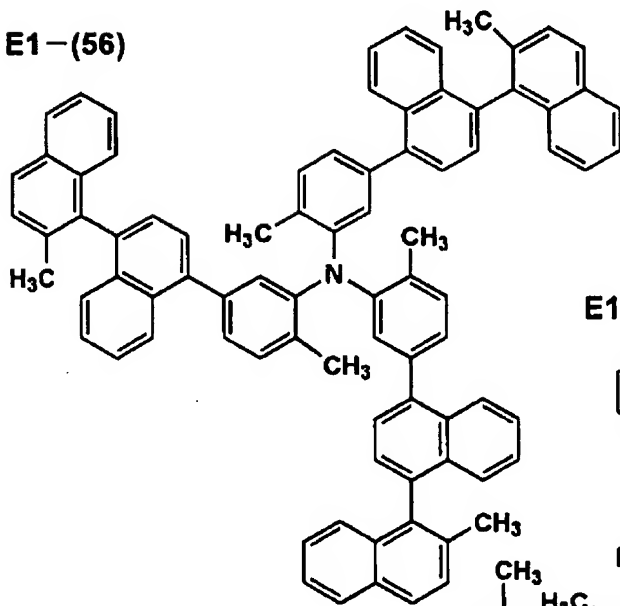
[0912]

[Chemical formula 528]

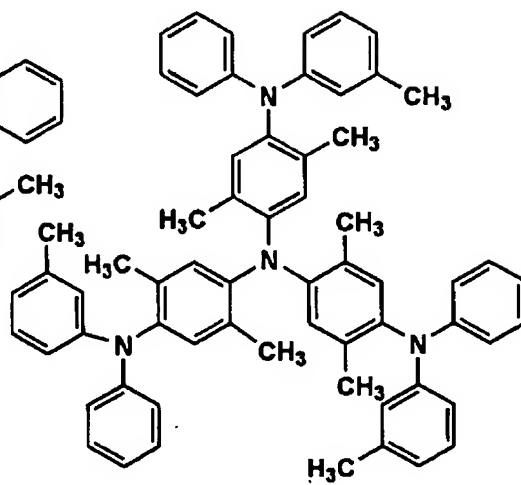
E1-(55)



E1-(56)



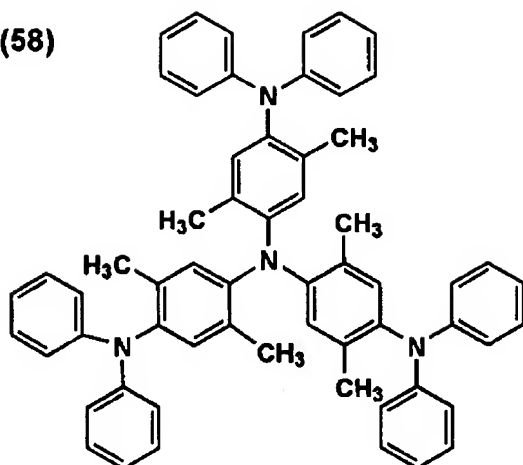
E1-(57)



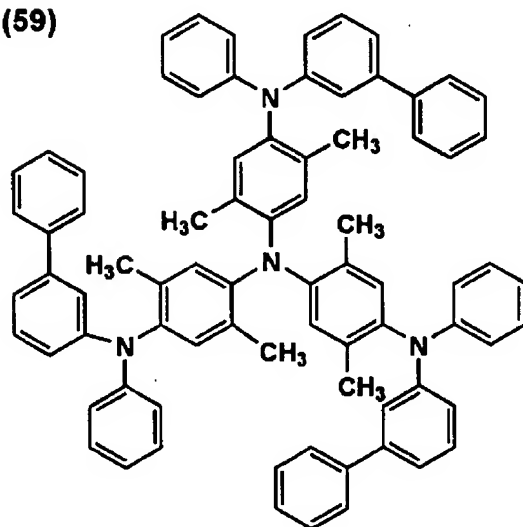
[0913]

[Chemical formula 529]

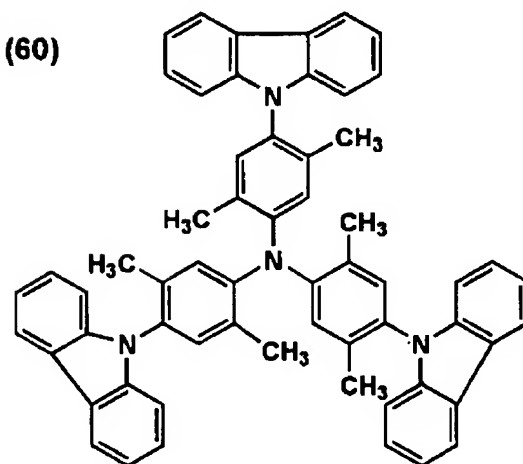
E1-(58)



E1-(59)



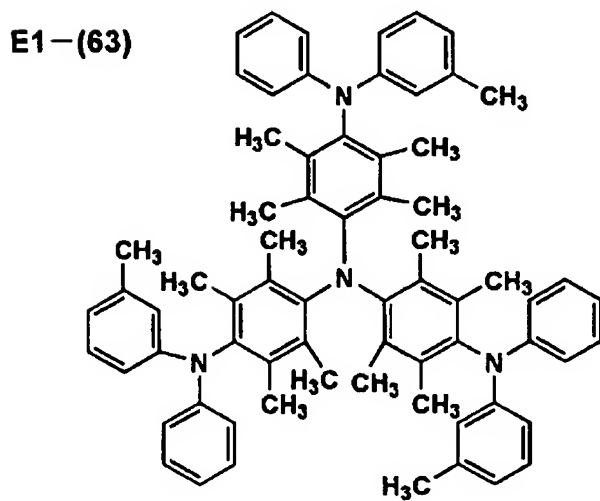
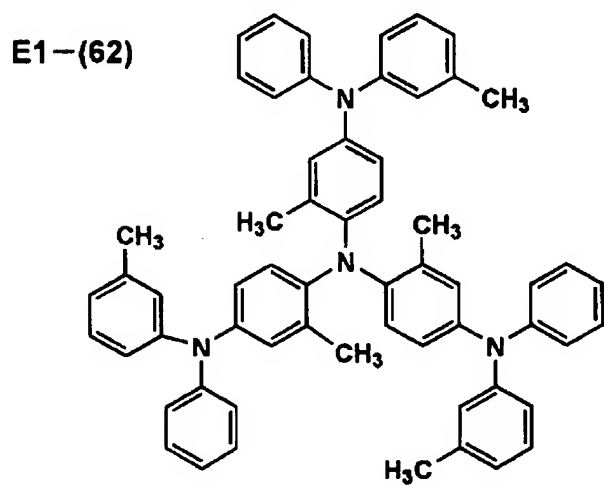
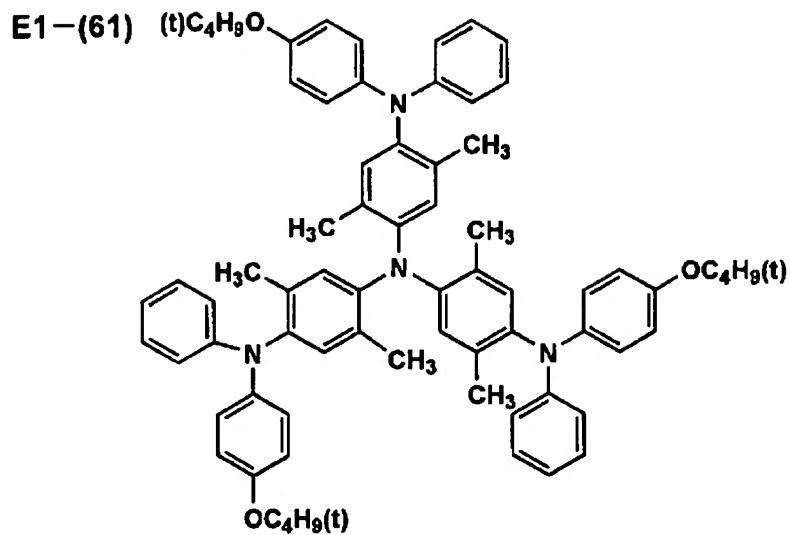
E1-(60)



[0914]

[Chemical formula 530]





[0915]

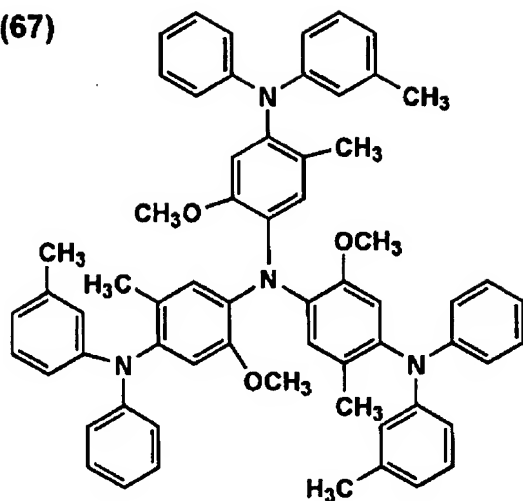
[Chemical formula 531]



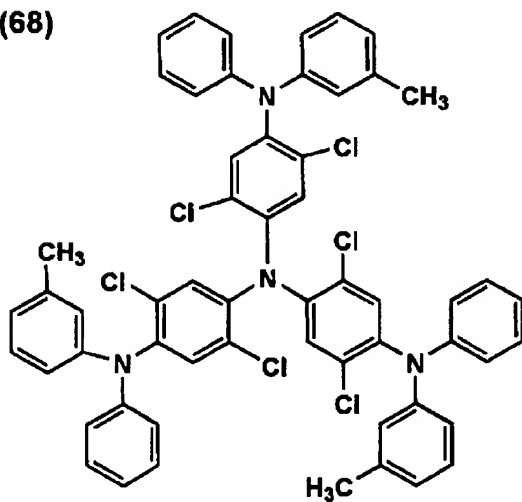
[0916]

[Chemical formula 532]

E1-(67)



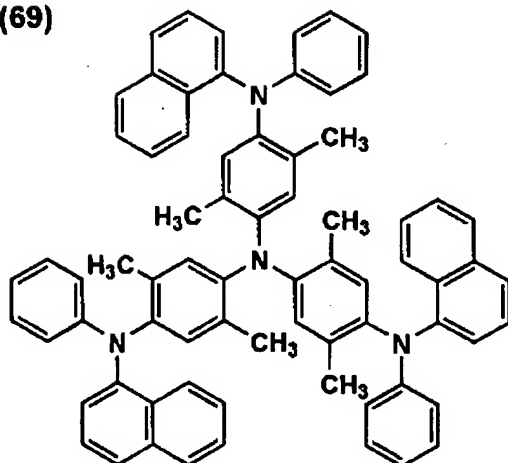
E1-(68)



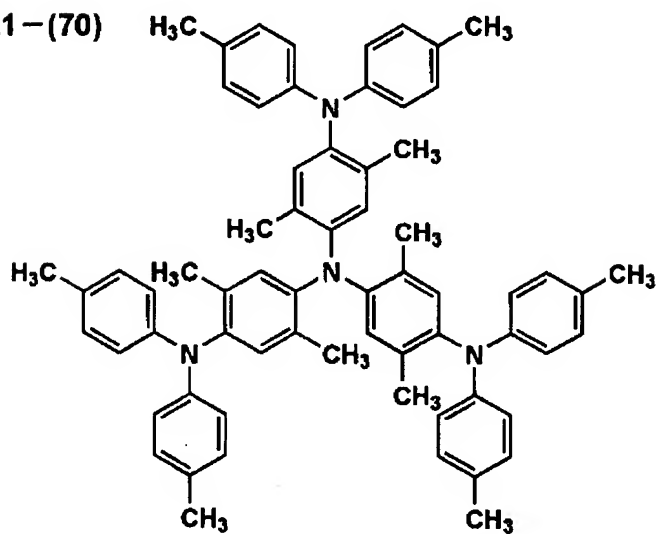
[0917]

[Chemical formula 533]

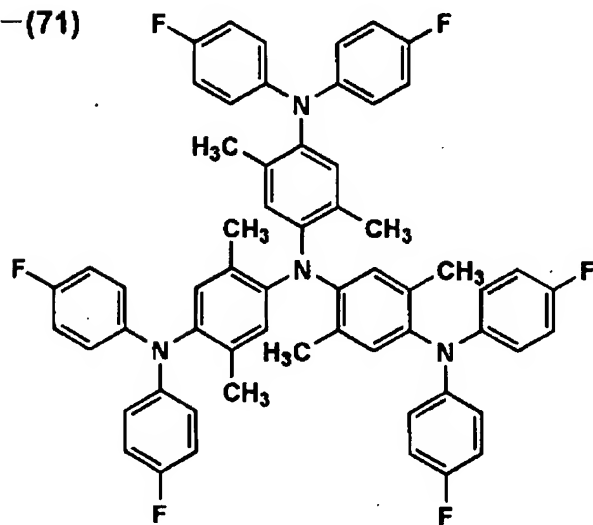
E1-(69)



E1-(70)

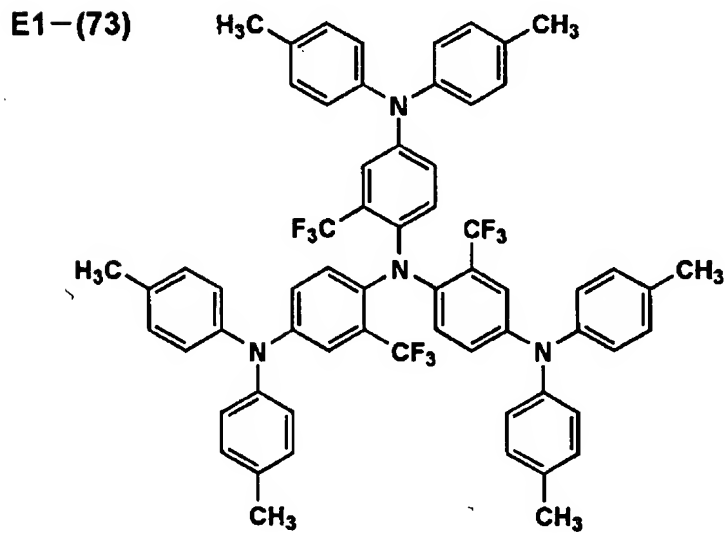
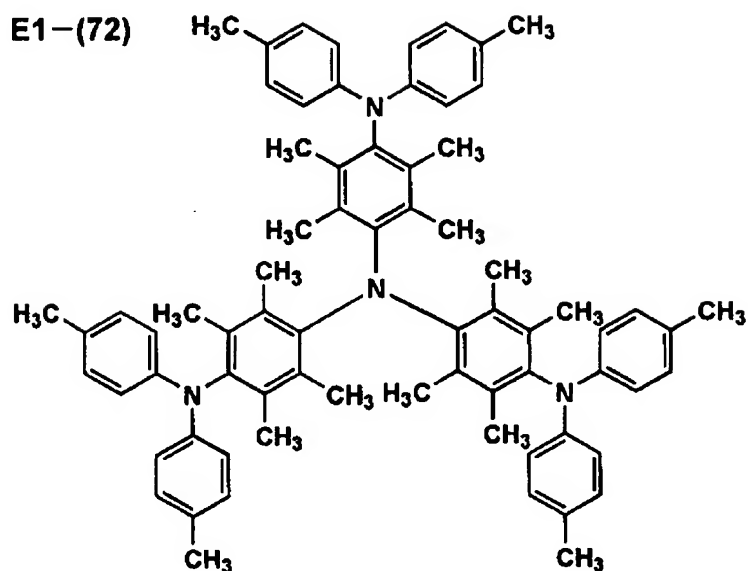


E1-(71)



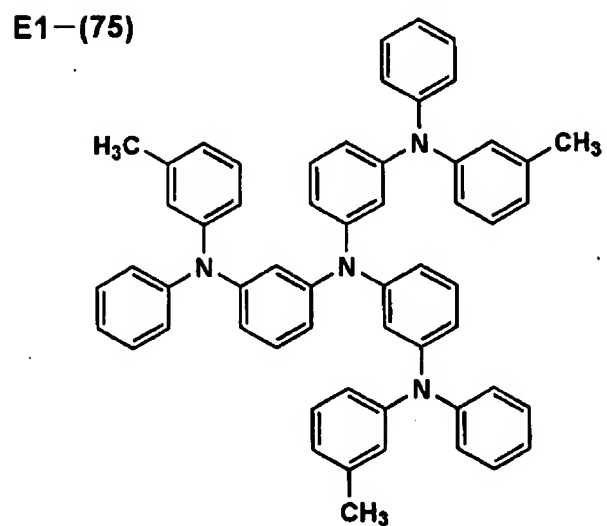
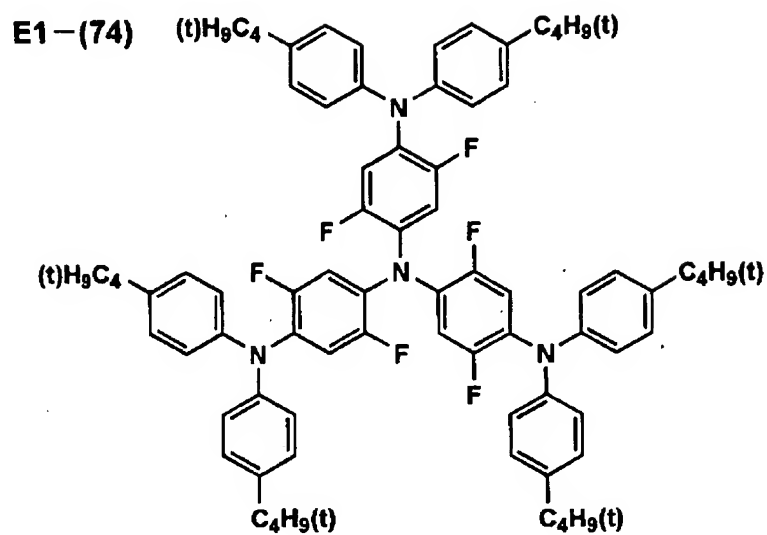
[0918]

[Chemical formula 534]



[0919]

[Chemical formula 535]

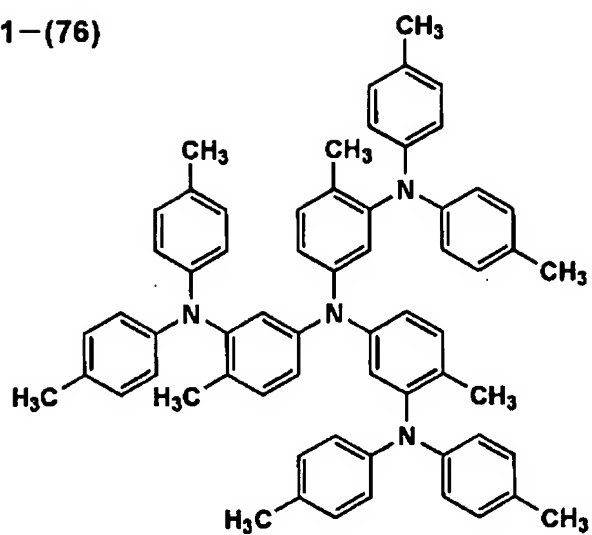




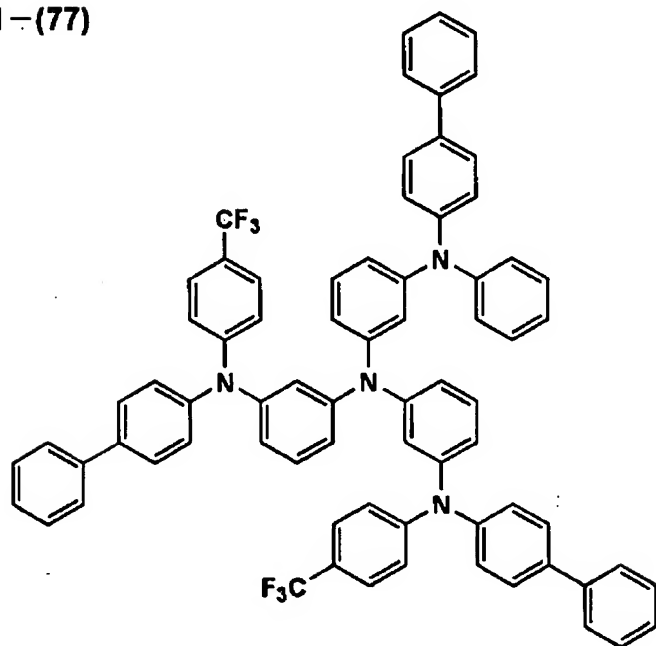
[0920]

[Chemical formula 536]

E1-(76)



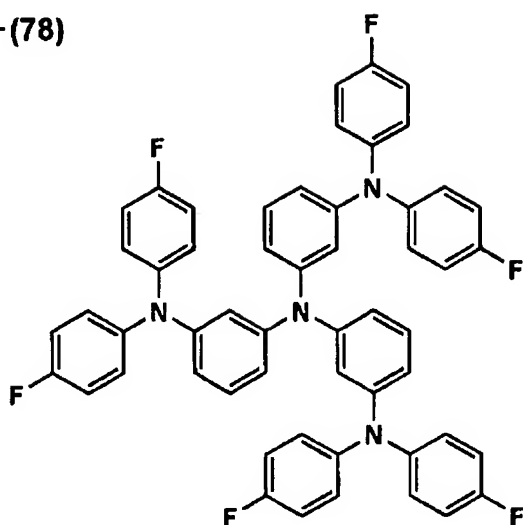
E1-(77)



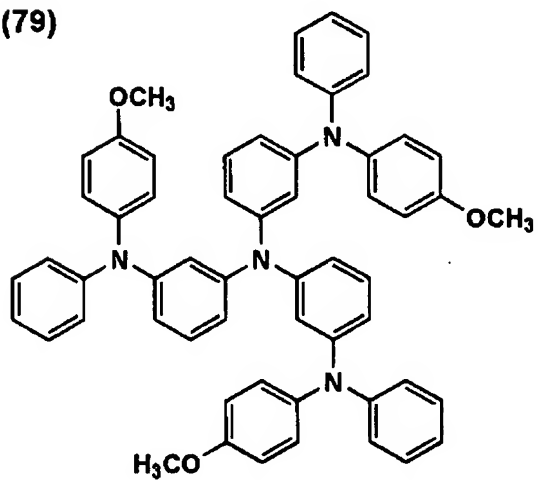
[0921]

[Chemical formula 537]

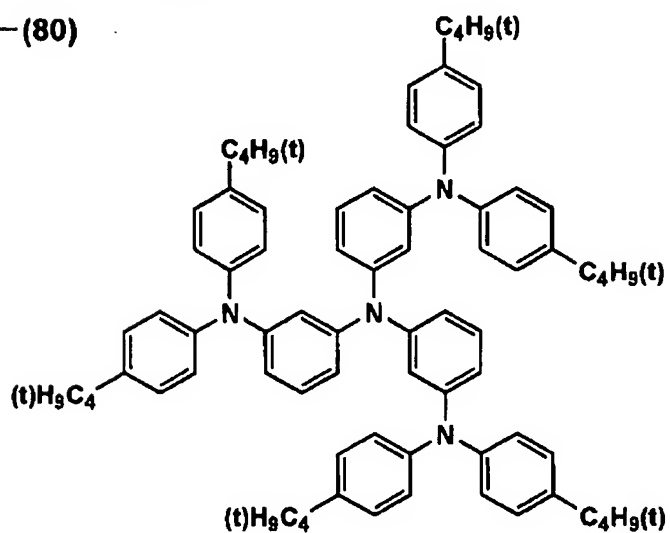
E1-(78)



E1-(79)



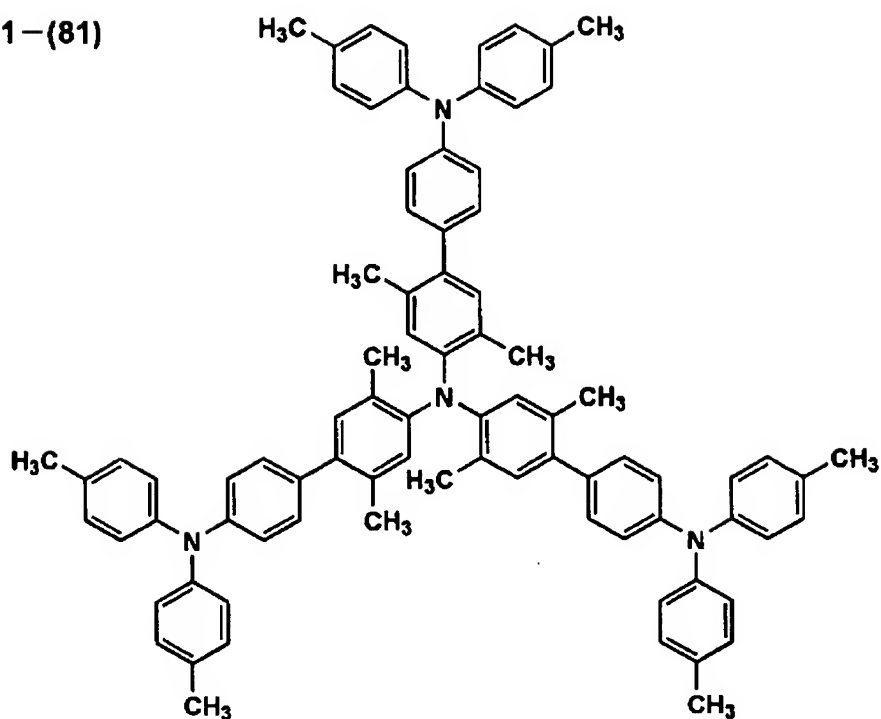
E1-(80)



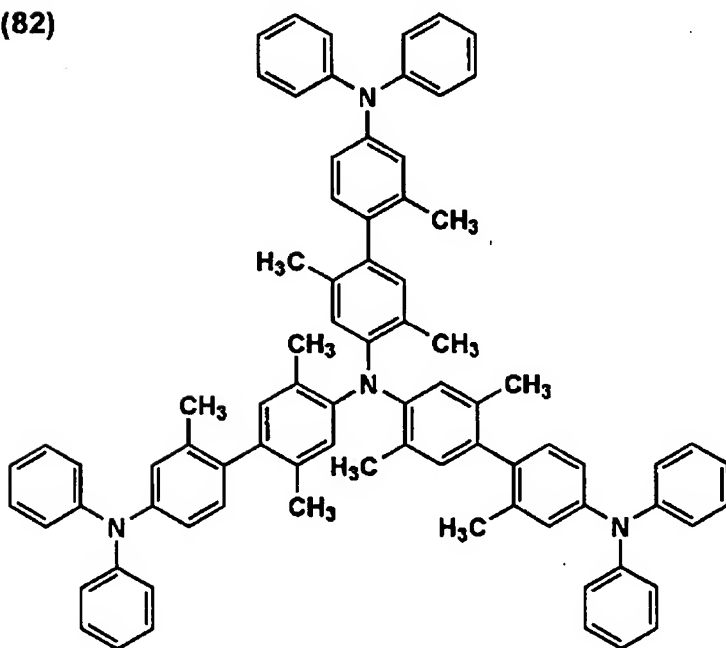
[0922]

[Chemical formula 538]

E1-(81)



E1-(82)



[0923] Since the purity affects luminescent property when using these compounds as an

electron hole transportation layer of an organic EL device, it is desirable after composition to purify reprecipitation refining, sublimation refining, etc.

[0924]The compound denoted by a general formula (E2-1) and (E2-5) is explained.

[0925]Since glass transition temperature ( $T_g$ ) is high, a general formula (E2-1) and the compound denoted by (E2-5) have the heat stability of enough as a material of an organic electroluminescence element, and it is preferred that it is 100 degrees or more as  $T_g$ .

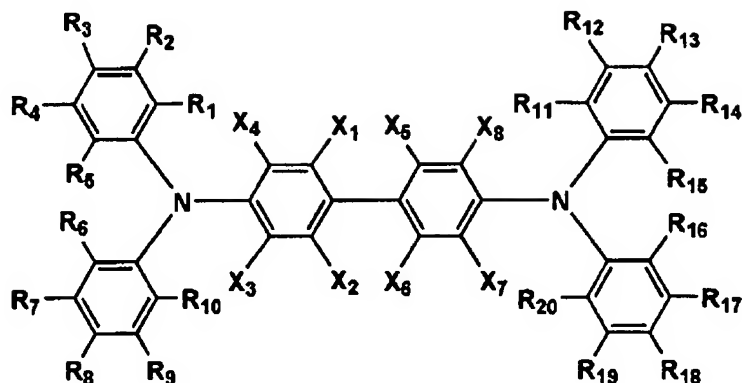
[0926]In said general formula (E2-1),  $X_1$  thru/or  $X_8$  and  $R_1$  thru/or  $R_{20}$  express a hydrogen atom or a substituent respectively, it may differ respectively, or may be the same and at least one of  $X_1$ ,  $X_2$ ,  $X_5$ , and  $X_6$  expresses a substituent. When  $X_1$  thru/or  $X_8$  and  $R_1$  thru/or  $R_{20}$  express a substituent, as the substitution preferably, an alkyl group (for example, a methyl group, an ethyl group, an isopropyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, a perfluoro propyl group, A perfluoro n-butyl group, a perfluoro t-butyl group, t-butyl group, etc., A cycloalkyl machine (for example, a cyclopentyl group, a cyclohexyl group, etc.), Aalkyl groups (for example, a benzyl group, 2-FENECHIRU machine, etc.), an aryl group. (For example, a phenyl group, a naphthyl group, p-trill machine, p-chlorophenyl machine, etc.), Alkoxy groups (for example, a methoxy group, an ethoxy basis, an isopropoxy group, a butoxy machine, etc.), aryloxy groups (for example, phenoxy group etc.), arylamino machines (for example, diphenylamino machine etc.), etc. are mentioned. These bases may be replaced further and, [ as a substituent ] For example, a halogen atom, a hydrogen atom, a trifluoromethyl group, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkylthio group, a dialkylamino group, a dibenzylamino machine, a diaryl amino group, etc. are mentioned.

[0927]The compound denoted by said general formula (E2-1) is preferably denoted by the following general formula (E2-2).

[0928]

[Chemical formula 539]

一般式(E2-2)



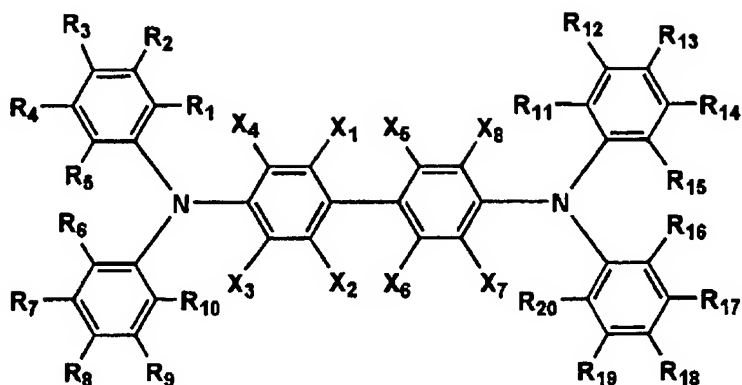
[0929] In a general formula (E2-2), X<sub>1</sub> thru/or X<sub>8</sub> and R<sub>1</sub> thru/or R<sub>20</sub> express a hydrogen atom or a substituent respectively, it may differ respectively, or may be the same and at least two of X<sub>1</sub>, X<sub>2</sub>, X<sub>5</sub>, and X<sub>6</sub> express a substituent. The thing same as a substituent as what was indicated as an example of a substituent by the above-mentioned general formula (E2-1) is mentioned.

[0930] The compound denoted by said general formula (E2-1) is preferably denoted by the following general formula (E2-3) again.

[0931]

[Chemical formula 540]

一般式(E2-3)



[0932] In a general formula (E2-3), X<sub>1</sub> thru/or X<sub>8</sub> and R<sub>1</sub> thru/or R<sub>20</sub> express a hydrogen atom or a substituent respectively, it may differ respectively, or may be the same and at least three of X<sub>1</sub>, X<sub>2</sub>, X<sub>5</sub>, and X<sub>6</sub> express a substituent. The thing same as a substituent as what was indicated as an example of a substituent by the above-mentioned general formula (E2-1) is mentioned.

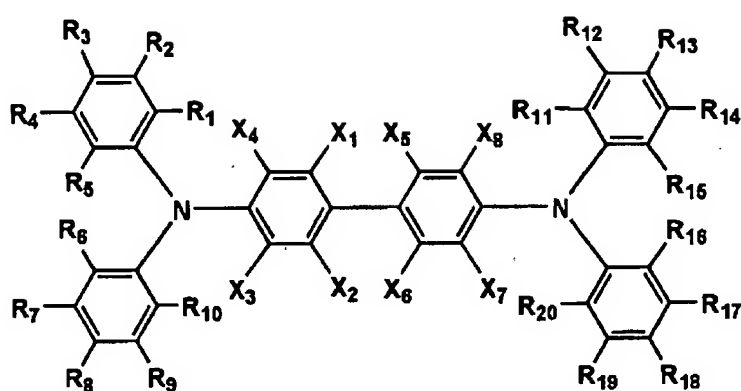
[0933] The compound denoted by said general formula (1) is preferably denoted by the following general formula (E2-4) again.

[0934]



[Chemical formula 541]

一般式(E2-4)



[0935]In a general formula (E2-4),  $X_1$  thru/or  $X_8$  and  $R_1$  thru/or  $R_{20}$  express a hydrogen atom or a substituent respectively, it may differ respectively, or may be the same and  $X_1$ ,  $X_2$ ,  $X_5$ , and  $X_6$  express a substituent. The thing same as a substituent as what was indicated as an example of a substituent by the above-mentioned general formula (E2-1) is mentioned.

[0936]In said general formula (E2-5),  $X_1$  thru/or  $X_8$  and  $R_1$  thru/or  $R_{20}$  express a hydrogen atom or a substituent respectively, It may differ respectively, or may be the same and the total value ( $EsX_1 + EsX_2 + EsX_5 + EsX_6$ ) of each solid parameter  $EsX_1$  of  $X_1$ ,  $X_2$ ,  $X_5$ , and  $X_6$ ,  $EsX_2$ ,  $EsX_5$ , and  $EsX_6$  is less than -2.5.

[0937]The synthetic method in particular of the compound shown by said general formula (E2-1) and (E2-5) is not limited. For example, the Ullman reaction using the copper catalyst of aromatic amine and an aromatic series iodine ghost can perform. It can carry out, even if it carries out the coupling reaction of the halogenation things of bird phenylamine using nickel and a palladium catalyst. For example, a bromide can be used as a Grignard reagent and coupling can be carried out using an another bromide and nickel catalysts (nickel(dpp)  $\text{Cl}_2$  etc.). After lithium-izing a bromide using an alkyllithium reagent, coupling of the bromide different from what was guided to way acid can be carried out using palladium catalysts ( $\text{Pd}(\text{PPh}_3)_4$  etc.). Coupling of the bromide can be carried out by using zinc as a reducing agent using a nickel catalyst.

[0938]Since the purity affects luminescent property when using these organic compounds as an electron hole transportation layer of an organic EL device, it is desirable after composition to purify reprecipitation refining, sublimation refining, etc.

[0939]Although the example of an organic compound denoted by general formula (E2-1) - (E2-5) concerning this invention below is shown, this invention is not limited to these.



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For subsequent translation(s), please click on the above "CONTINUE" button.

When continued, the current translation will be overwritten with the new translation.

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[Translation done.]

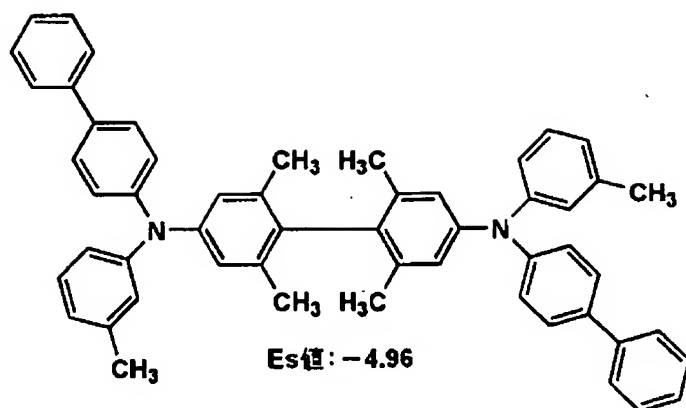
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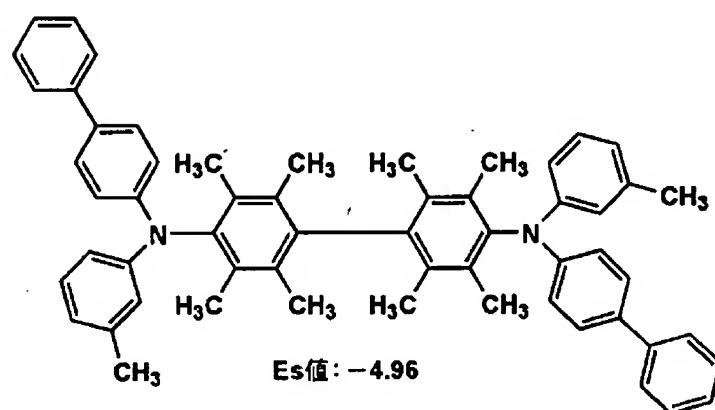
[0940]

[Chemical formula 542]

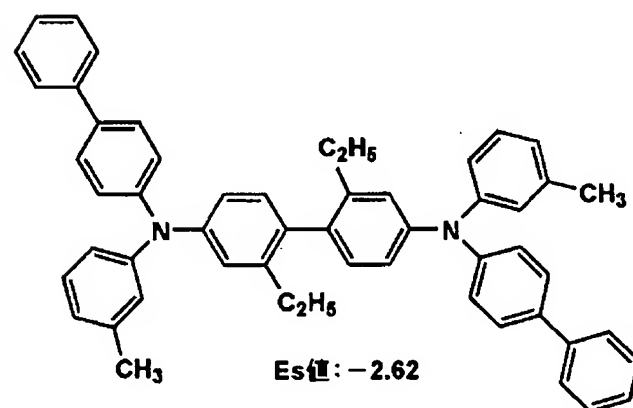
E2-(1)



E2-(2)



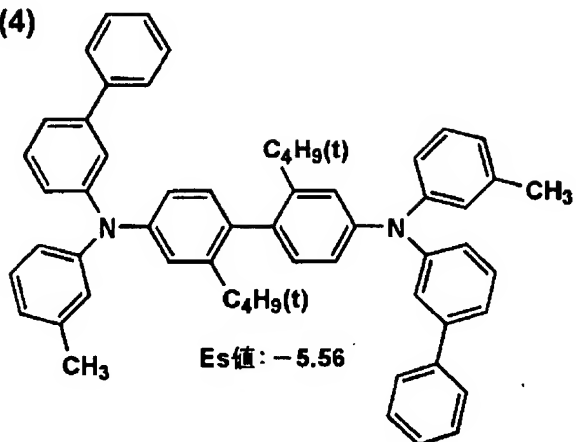
E2-(3)



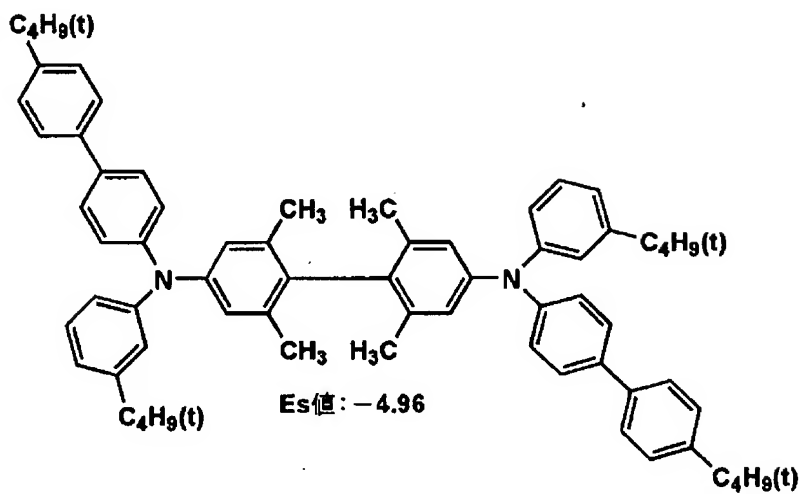
[0941]

[Chemical formula 543]

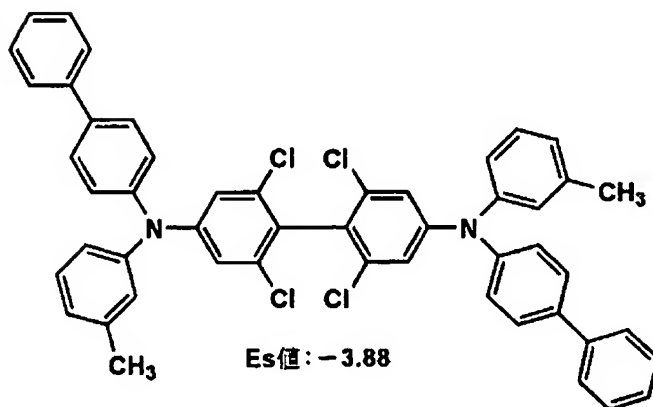
E2-(4)



E2-(5)

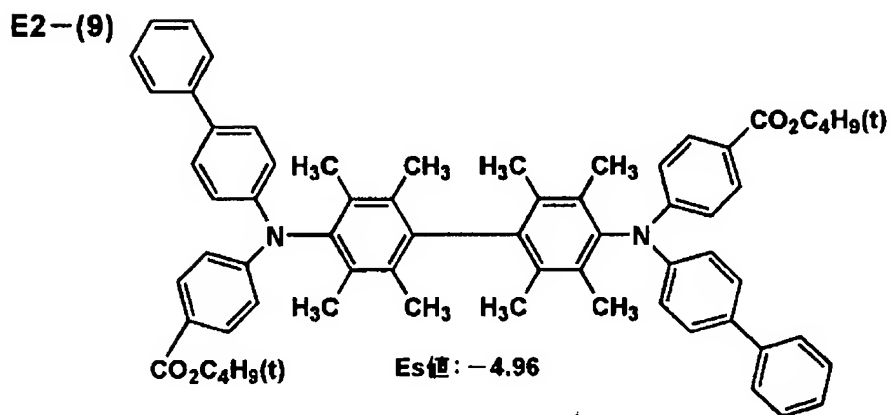
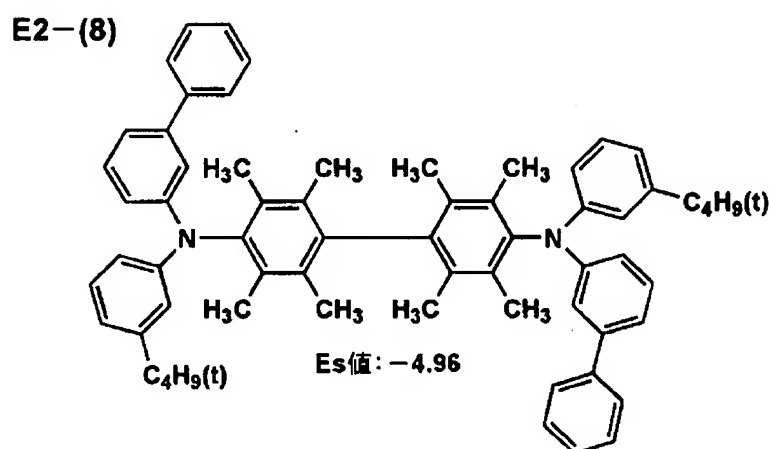
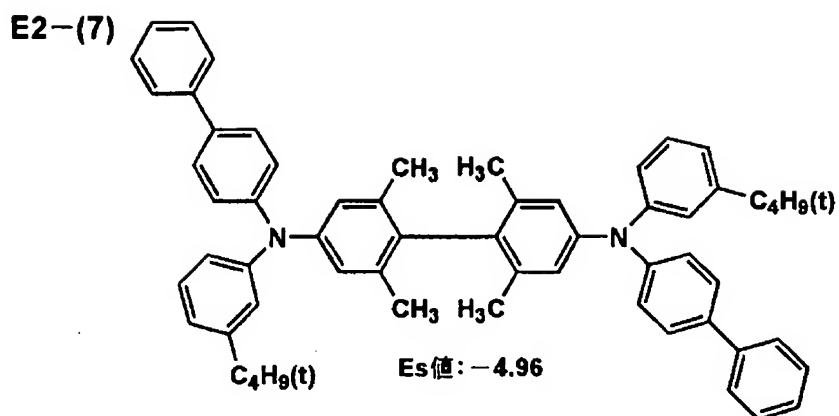


E2-(6)



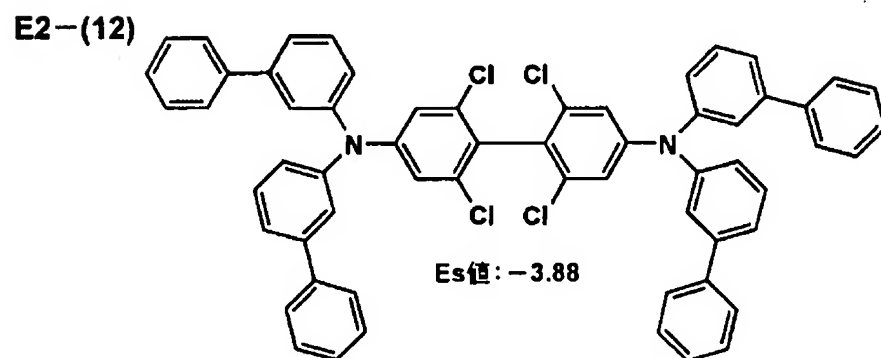
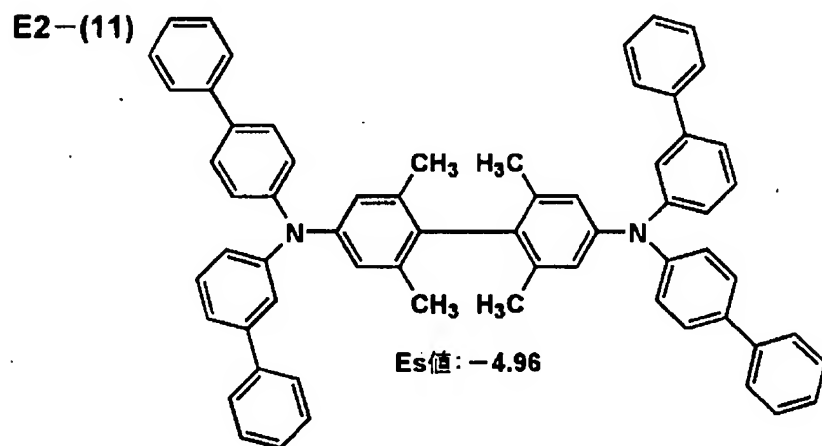
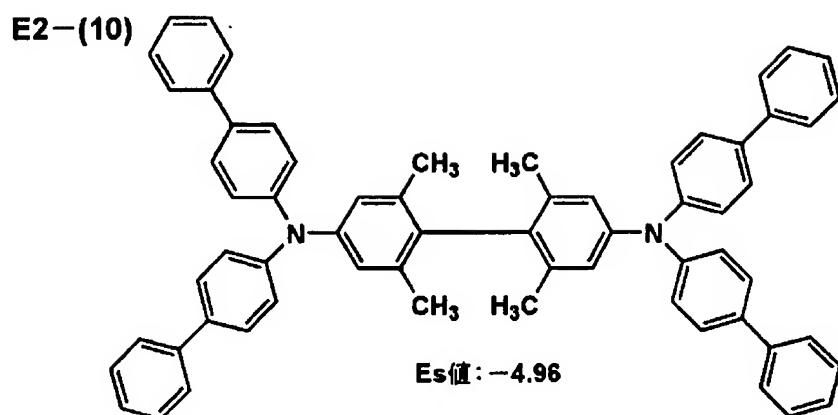
[0942]

[Chemical formula 544]



[0943]

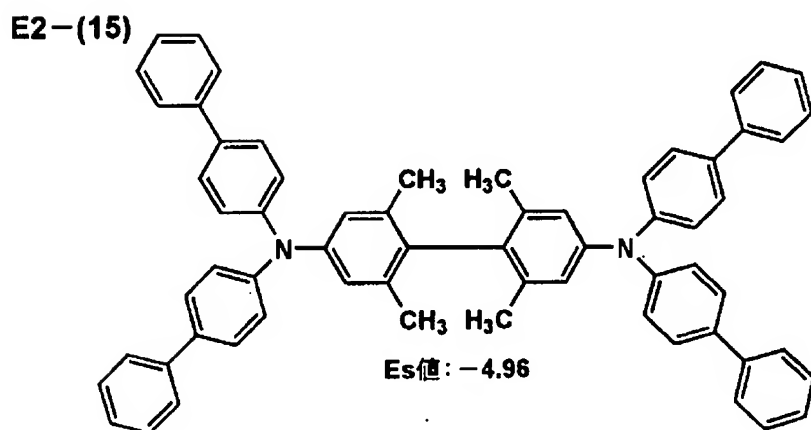
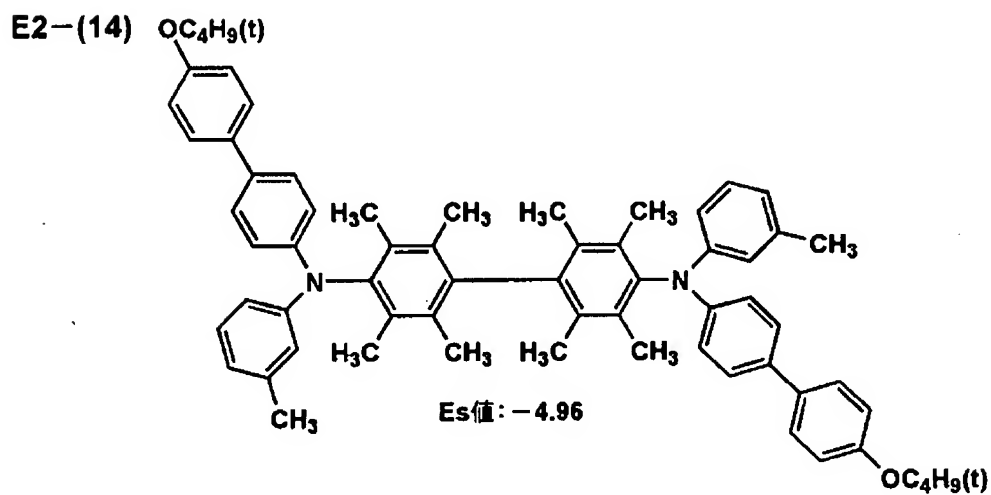
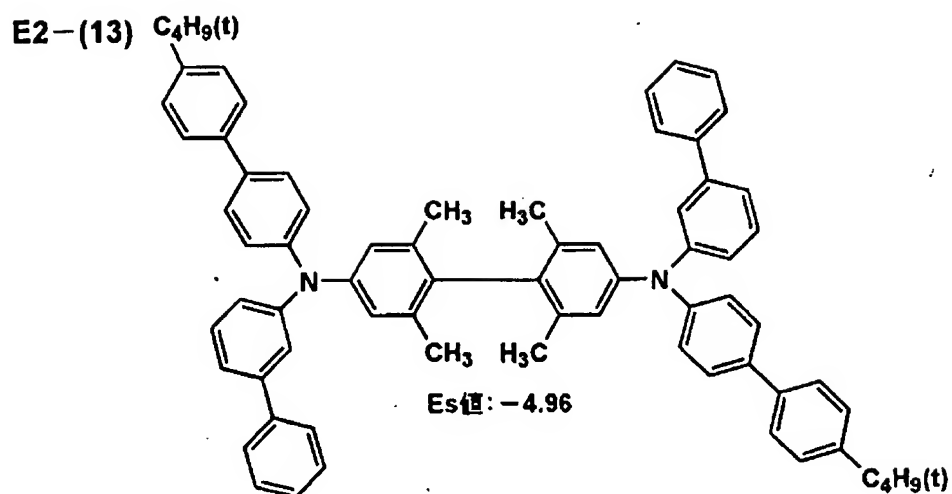
[Chemical formula 545]





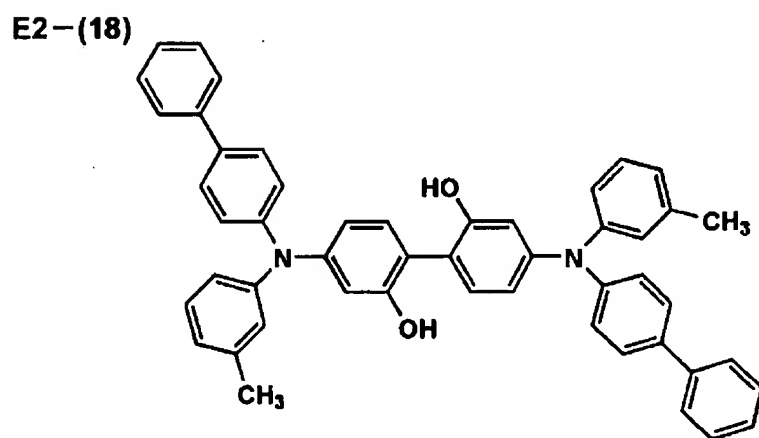
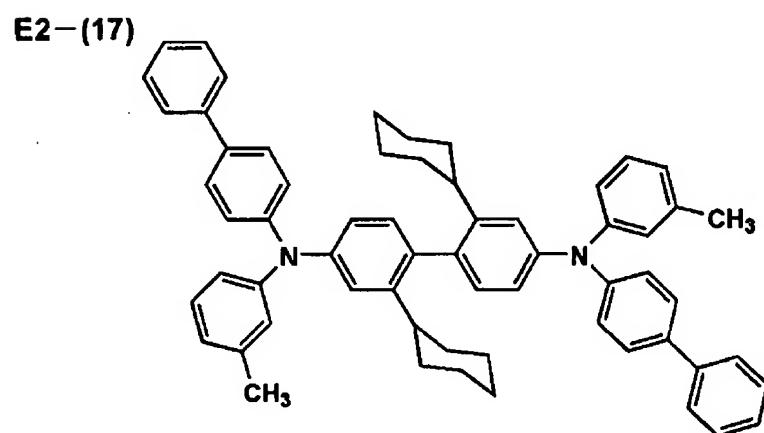
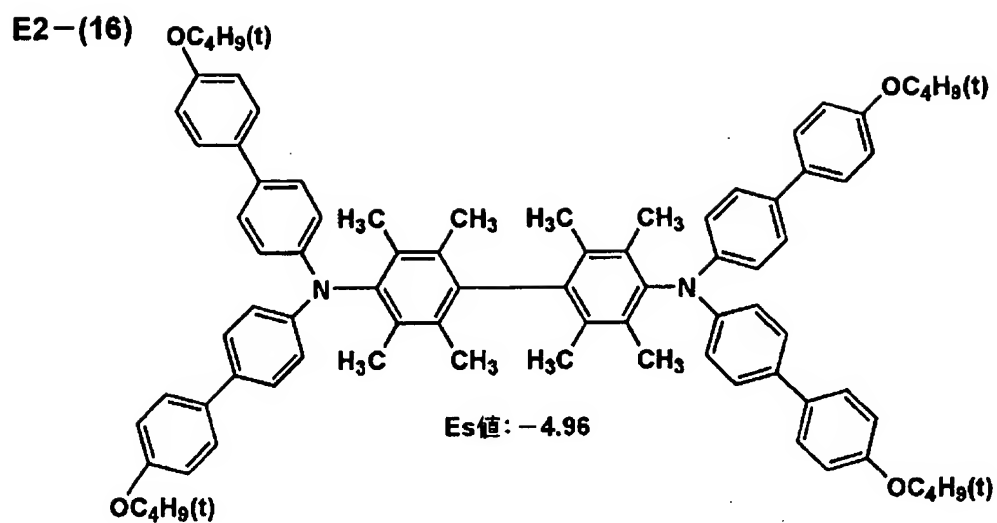
[0944]

[Chemical formula 546]



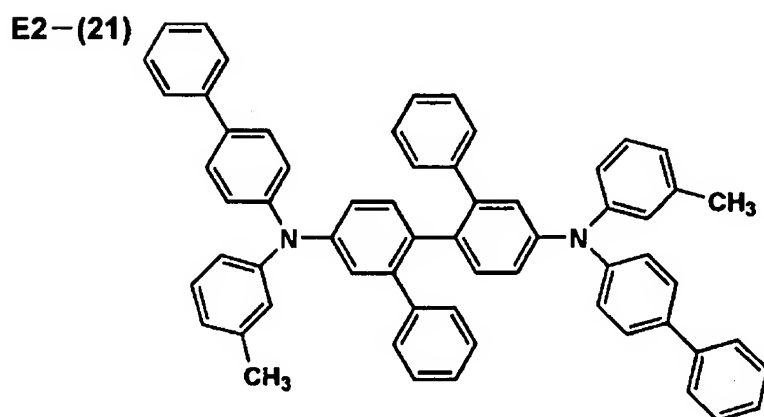
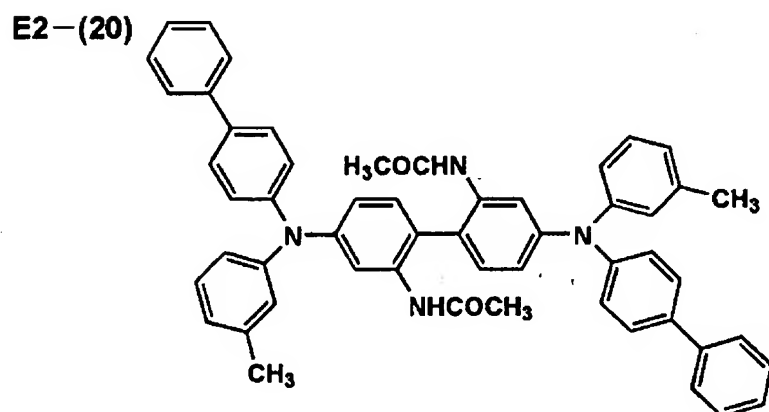
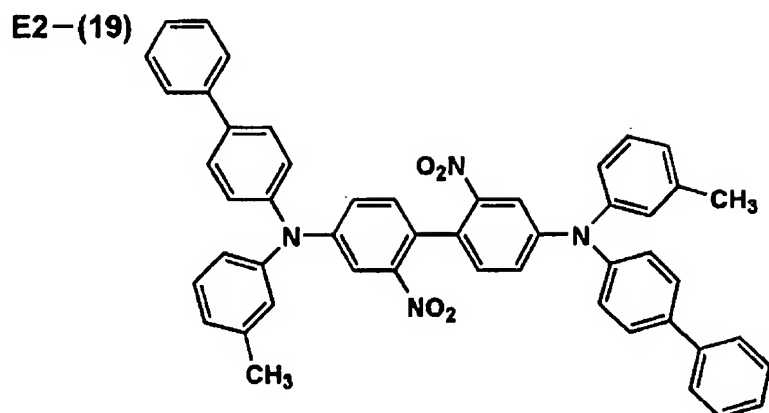
[0945]

[Chemical formula 547]



[0946]

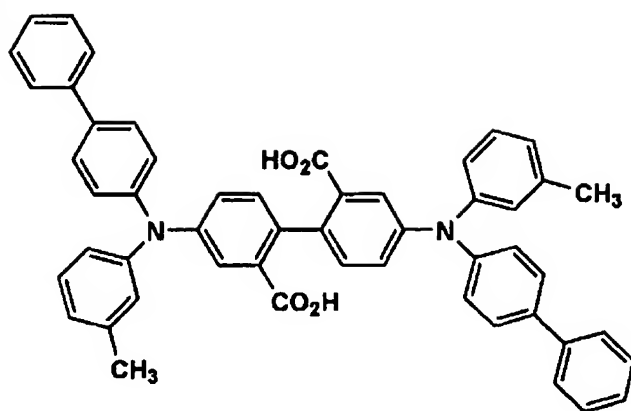
[Chemical formula 548]



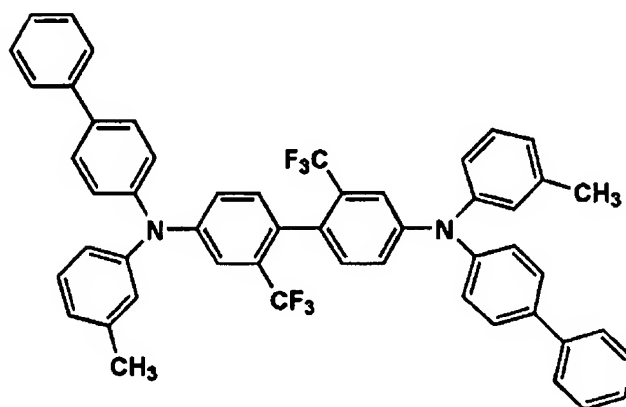
[0947]

[Chemical formula 549]

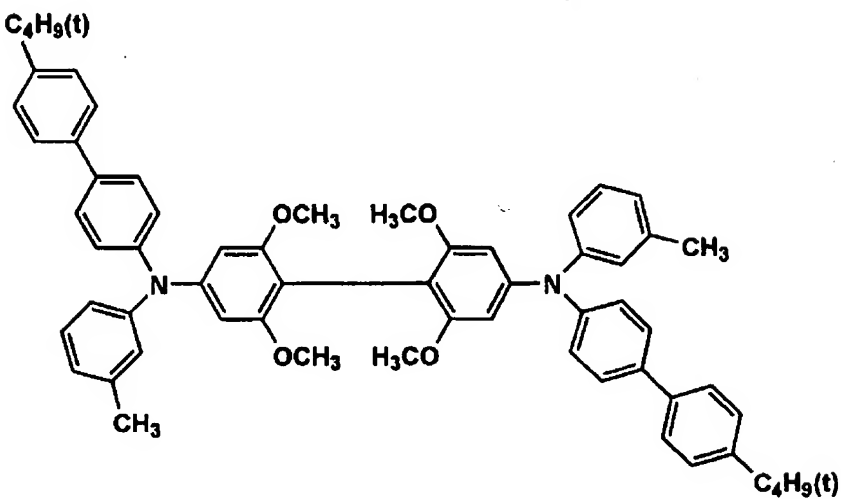
E2-(22)



E2-(23)



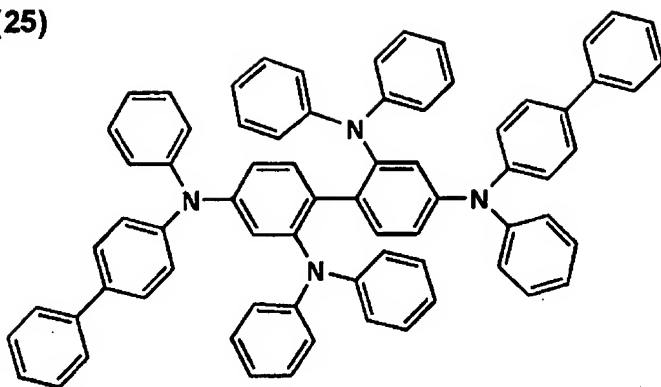
E2-(24)



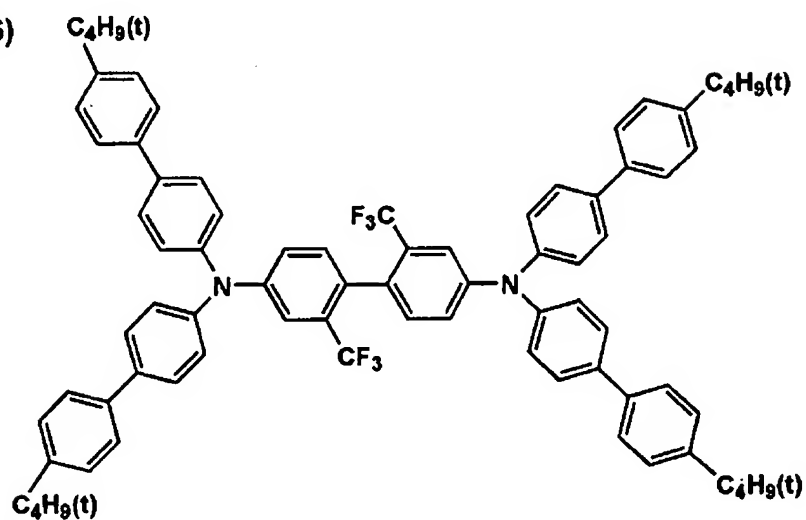
[0948]

[Chemical formula 550]

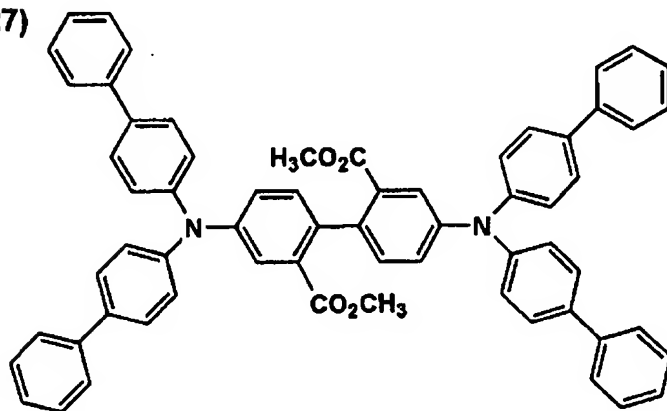
E2-(25)



E2-(26)



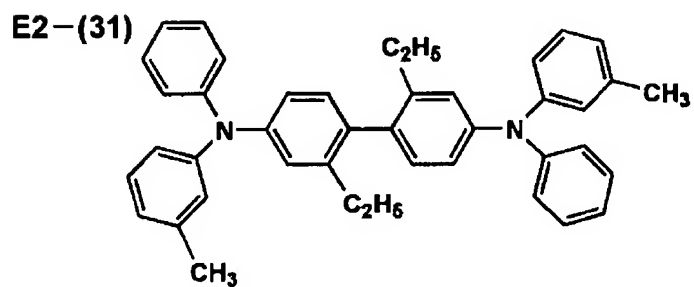
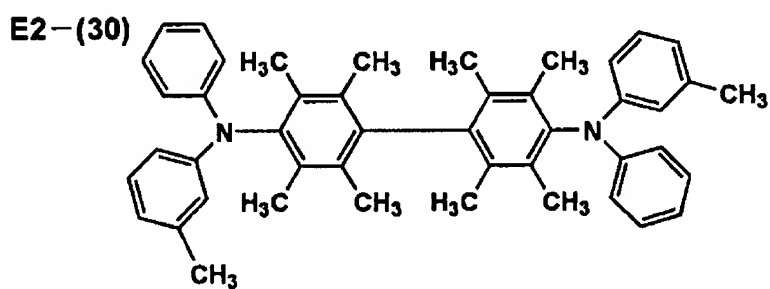
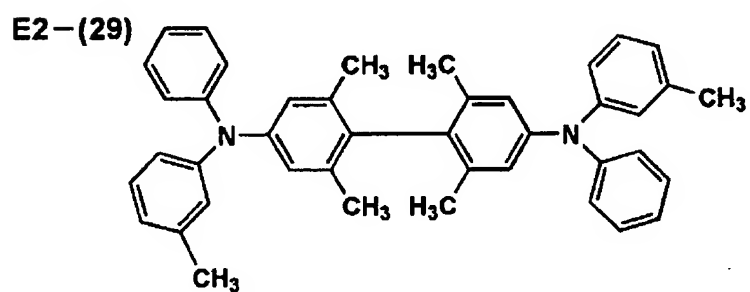
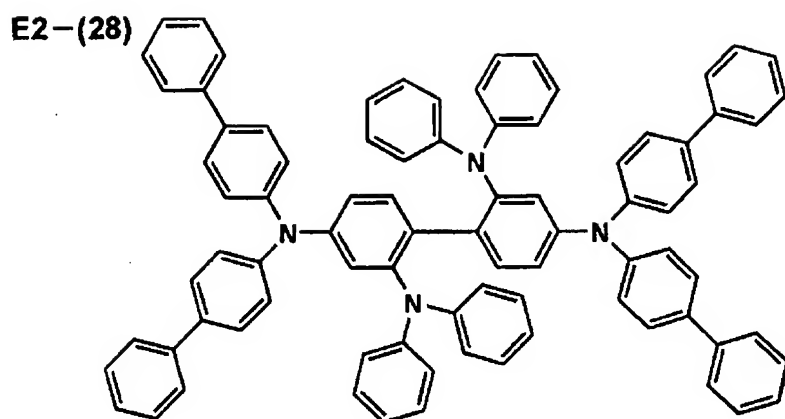
E2-(27)





[0949]

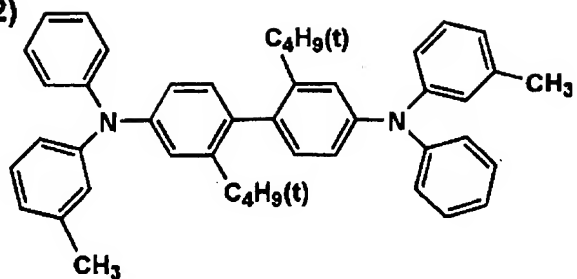
[Chemical formula 551]



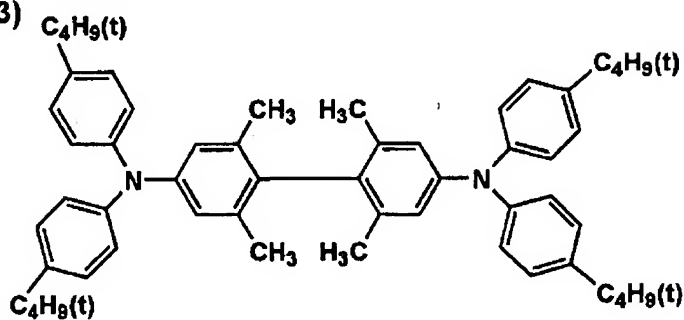
[0950]

[Chemical formula 552]

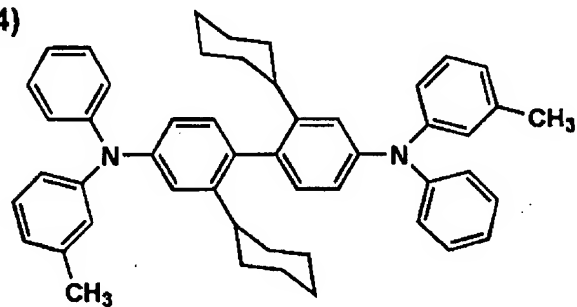
E2-(32)



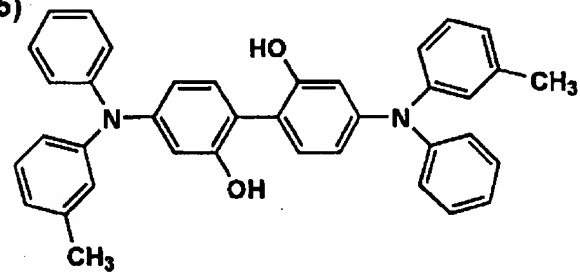
E2-(33)



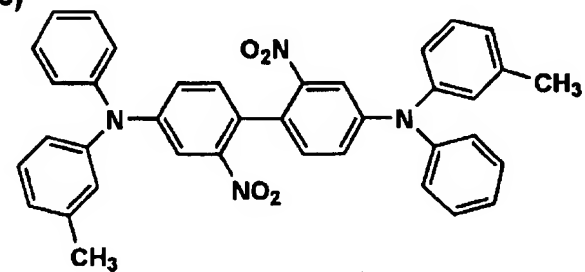
E2-(34)



E2-(35)



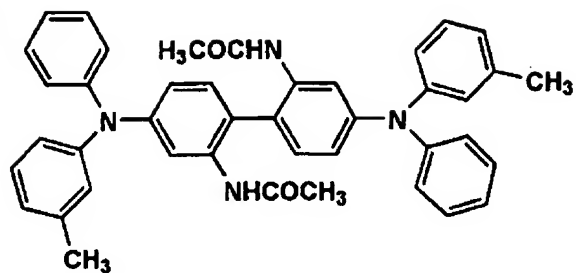
E2-(36)



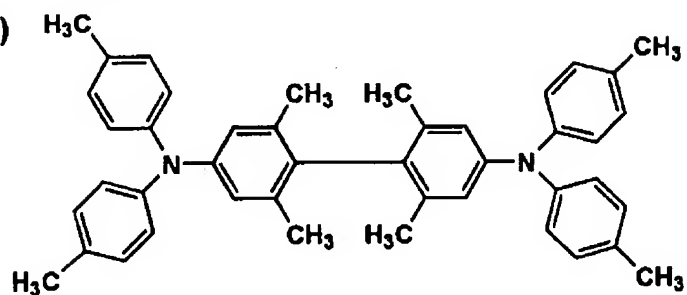
[0951]

[Chemical formula 553]

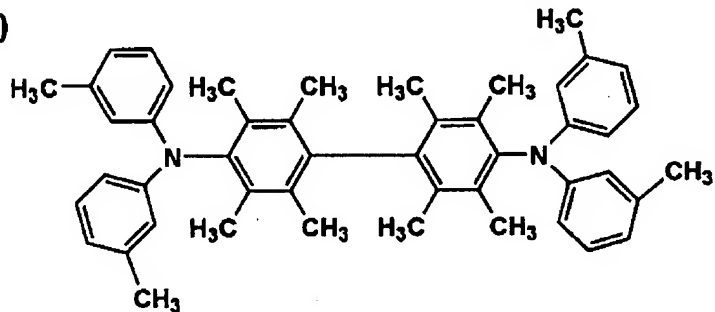
E2-(37)



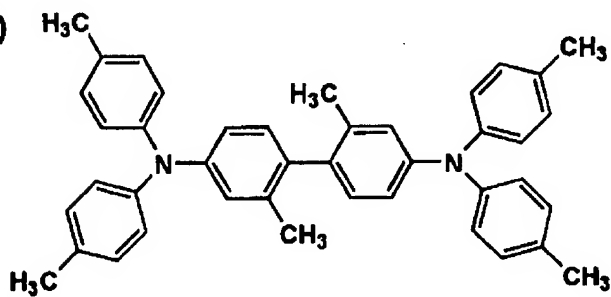
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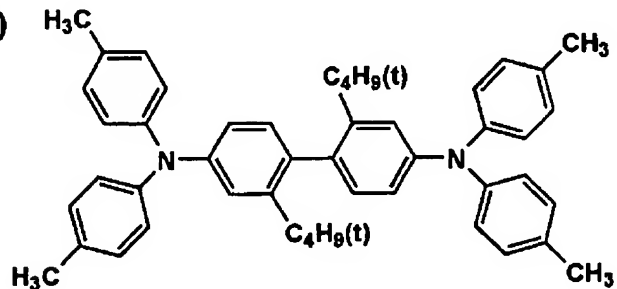
E2-(39)



E2-(40)

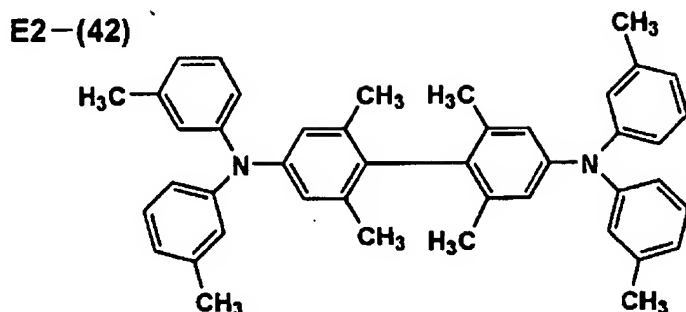


E2-(41)



[0952]

[Chemical formula 554]



[0953]It explains still in detail about the compound of this invention.

[0954]First, in this invention, the compound denoted by general formula (F1-1) - (F1-3) is explained.  $M_0$  expresses indium or gallium among a formula. In general formula (F1-1) - (F1-3),  $R_1$ - $R_{12}$ ,  $R_{21}$ - $R_{32}$ ,  $R_{41}$ - $R_{52}$ , and  $L_1$  express a hydrogen atom or a substituent respectively independently. When  $R_1$ - $R_{12}$ ,  $R_{21}$ - $R_{32}$ ,  $R_{41}$ - $R_{52}$ , and  $L_1$  express a substituent, [ as the substituent ] an alkyl group (for example, a methyl group, an ethyl group, an isopropyl group, and a hydroxyethyl machine.) A methoxymethyl machine, a trifluoromethyl group, a perfluoro propyl group, A perfluoro n-butyl group, a perfluoro t-butyl group, t-butyl group, etc., A cycloalkyl machine (for example, a cyclopentyl group, a cyclohexyl group, etc.), aralkyl groups (for example, a benzyl group, 2-FENECHIRU machine, etc.) and an aryl group (for example, a phenyl group.) alkoxy groups (for example, an ethoxy basis.), such as a naphthyl group, p-trill machine, and p-chlorophenyl machine Aryloxy groups (for example, phenoxy group etc.), such as an isopropoxy group and a butoxy machine, a cyano group, an amino group (a dimethylamino group, a diaryl amino group), a hydroxyl group, halogen atoms (a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc.), etc. are mentioned.

[0955]These bases may be replaced further and, [ as a substituent ] A halogen atom, a

trifluoromethyl group, a cyano group, a nitro group, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkylthio group, a dibenzylamino machine, a diaryl amino group, a dialkylamino group, etc. are mentioned.

[0956]When  $R_1$ - $R_{12}$ ,  $R_{21}$ - $R_{32}$ ,  $R_{41}$  -  $R_{52}$  express a substituent, the substituents of the substituents of the substituents of  $R_1$  -  $R_{12}$ ,  $R_{21}$  -  $R_{32}$ ,  $R_{41}$  -  $R_{52}$  may be connected respectively, and they may form a ring.

[0957]When  $L_1$  expresses a substituent, they are aryl groups (for example, a phenyl group, a biphenyl machine, a phenanthrene machine, a naphthyl group, p-trimethyl machine, p-chlorophenyl machine, etc.) or a heterocyclic machine preferably.

[0958]In said general formula (F1-2) and (F1-3),  $M_1$  expresses indium or gallium and  $L_2$  and  $L_3$  express a heterocyclic machine. As a heterocyclic machine, a pyrrolyl machine, a pyrrolidinyl machine, a pyrazolyl machine, an imidazolyl group, There are a pyridyl group, a triazolyl machine, a benzimidazolyl machine, a benzothiazolyl machine, a benzoxazolyl machine, a frill machine, a thienyl group, a thiazolyl machine, a tetrazolyl group, an oxadiazolyl machine, a triazolyl machine, etc.

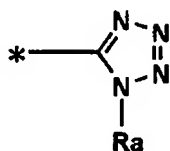
[0959]When  $L_1$  of said general formula (F1-1) is a heterocyclic machine, the basis denoted by following general formula (F1-A) - (F1-D) is preferred as a heterocyclic machine denoted by  $L_2$  and  $L_3$  in a general formula (F1-2) and (F1-3) as the heterocyclic machine.

[0960]

[Chemical formula 555]



一般式(F1-A)

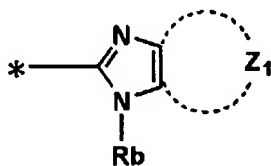


[0961]Ra expresses a hydrogen atom or a substituent among a formula, and \* expresses a binding site with a sulfur atom or an oxygen atom.

[0962]

[Chemical formula 556]

一般式(F1-B)

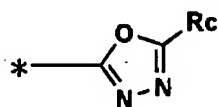


[0963]Rb expresses a hydrogen atom or a substituent among a formula, Z<sub>1</sub> expresses an atomic group required to form a ring, and \* expresses a binding site with a sulfur atom or an oxygen atom.

[0964]

[Chemical formula 557]

一般式(F1-C)

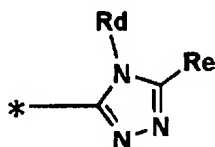


[0965]Rc expresses a hydrogen atom or a substituent among a formula, and \* expresses a binding site with a sulfur atom or an oxygen atom.

[0966]

[Chemical formula 558]

一般式(F1-D)



[0967]Rd and Re express a hydrogen atom or a substituent among a formula, and \* expresses a binding site with a sulfur atom or an oxygen atom.

[0968]In general formula (F1-A) - (F1-D), Ra, Rb, Rc, Rd, and Re express a hydrogen atom or a substituent. When Ra, Rb, Rc, Rd, and Re express a substituent, it is synonymous with what was explained in general formula (F1-1) - (F1-3) as the substituent, and they are an alkyl group and an aryl group preferably.

[0969]These bases may be replaced further.

[0970]The heterocycle which the hydrocarbon ring which is not limited as an atomic group required to form the ring denoted by  $Z_1$  especially if it is a ring more than 3 member, and comprised only a carbon atom and a hydrogen atom may be sufficient as, and contains the hetero atom may be sufficient. It is a ring of 5 - 7 member preferably. These may have two or more arbitrary substituents independently, respectively.

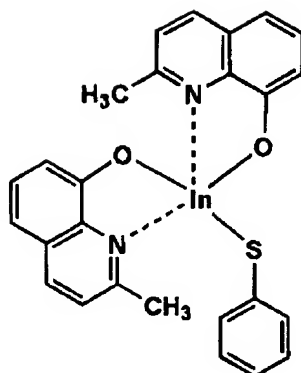
[0971]The compound denoted by a general formula (F1-4) and (F1-5) is explained.  $M_2$  and  $M_3$  express aluminum, indium, or gallium among a formula, and  $M_4$  and  $M_5$  express indium or gallium.  $Ra_1$ - $Ra_{24}$ ,  $Rb_1$  -  $Rb_{24}$  express a hydrogen atom or a substituent respectively independently. When  $Ra_1$ - $Ra_{24}$ ,  $Rb_1$  -  $Rb_{24}$  express a substituent, it is synonymous with what was explained in general formula (F1-1) - (F1-3) as the substituent. Preferably, they are an alkyl group and an aryl group. These bases may be replaced further.

[0972]When  $Ra_1$ - $Ra_{24}$ ,  $Rb_1$  -  $Rb_{24}$  express a substituent, the substituents of the substituents of  $Ra_1$  -  $Ra_{24}$ ,  $Rb_1$  -  $Rb_{24}$  may be connected respectively, and they may form a ring. Although the example of the compound of this invention is shown below, it is not limited to these.

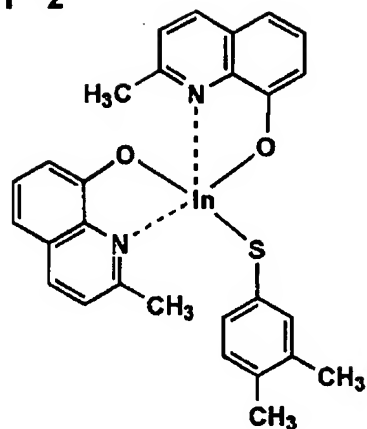
[0973]

[Chemical formula 559]

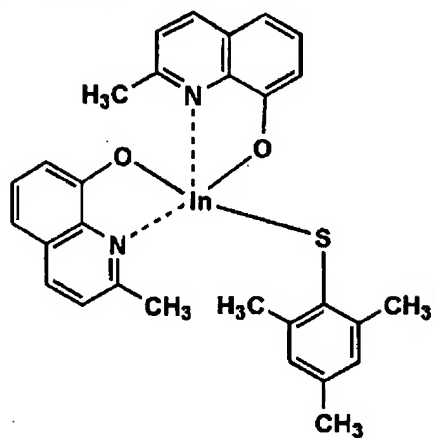
F1-1-1



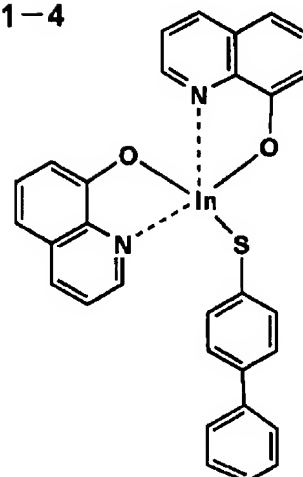
F1-1-2



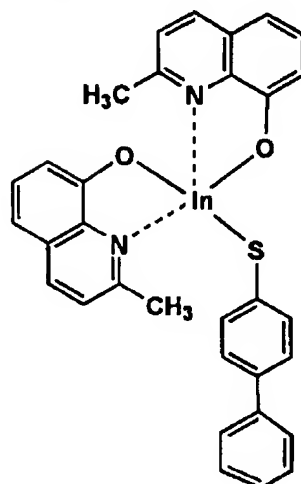
F1-1-3



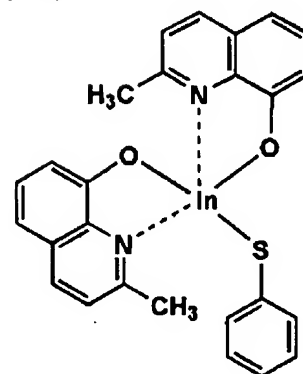
F1-1-4



F1-1-5



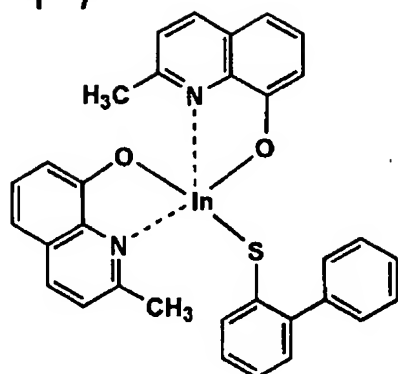
F1-1-6



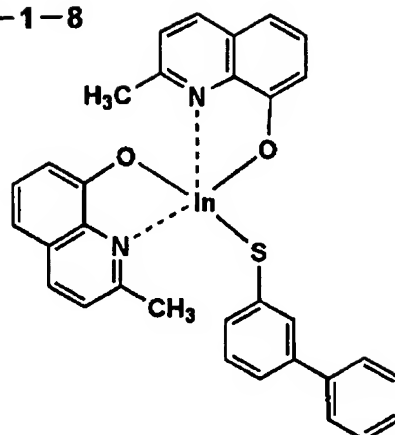
[0974]

[Chemical formula 560]

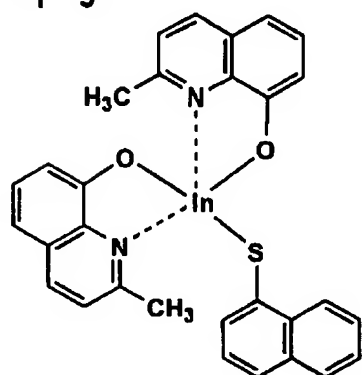
F1-1-7



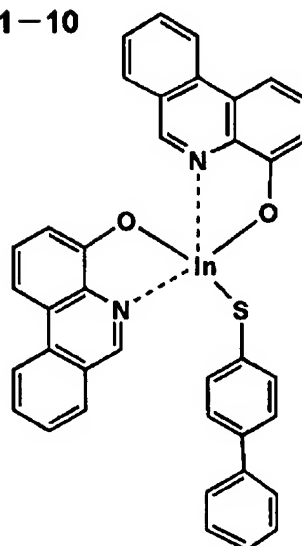
F1-1-8



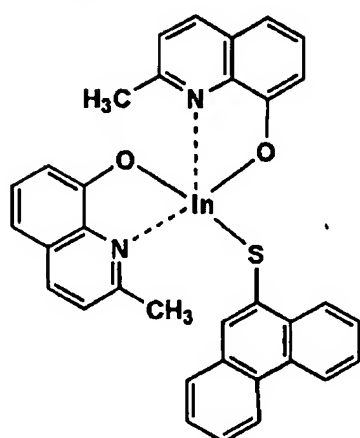
F1-1-9



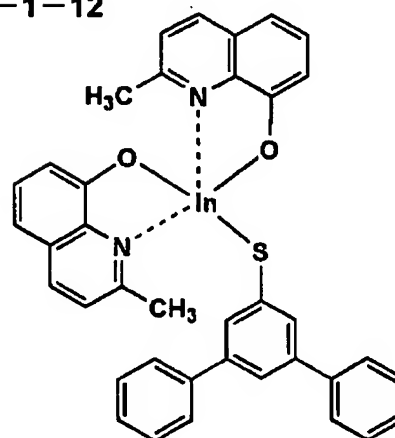
F1-1-10



F1-1-11



F1-1-12

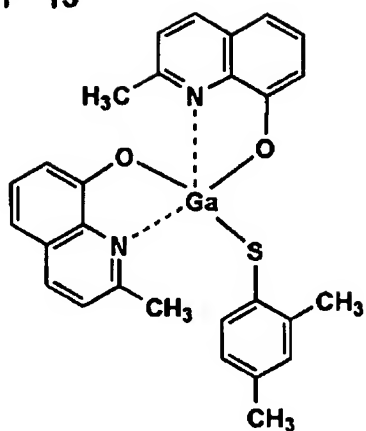


[0975]

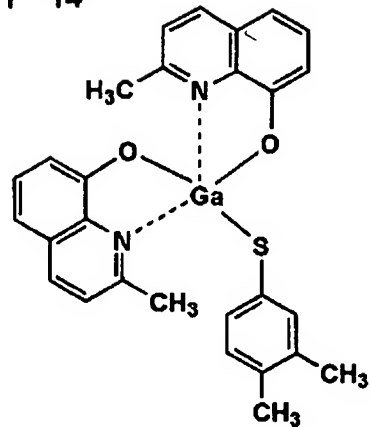
[Chemical formula 561]



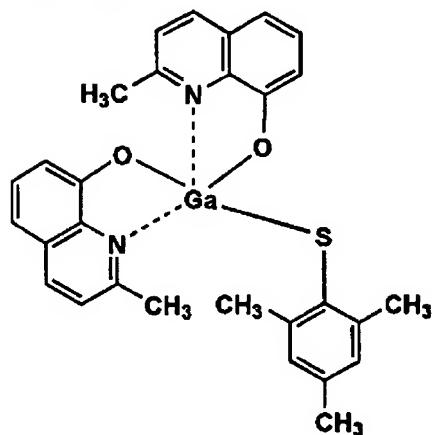
F1-1-13



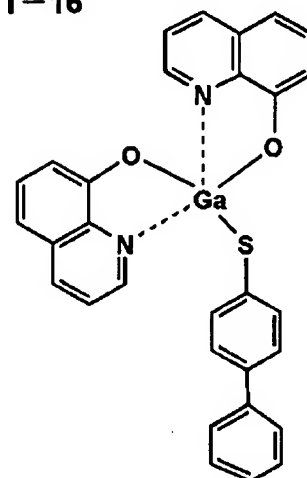
F1-1-14



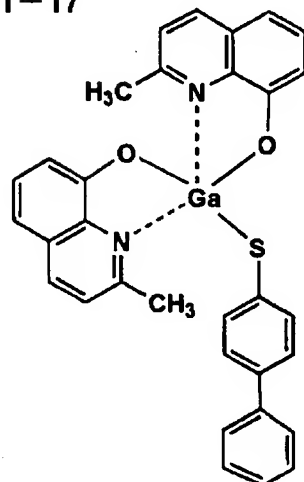
F1-1-15



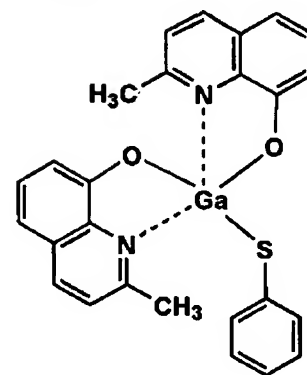
F1-1-16



F1-1-17



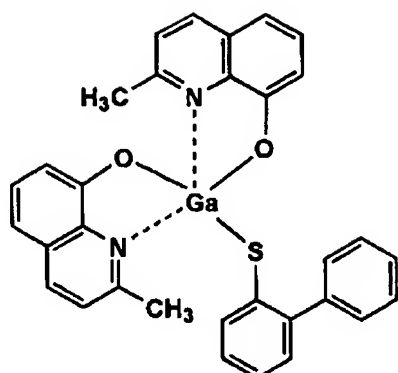
F1-1-18



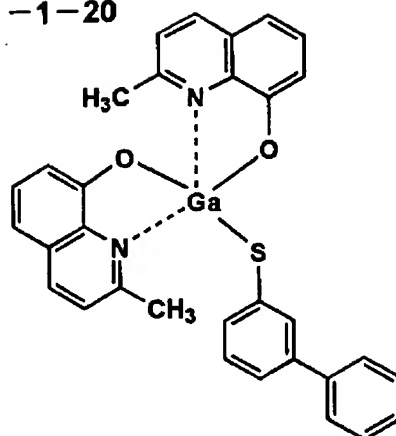
[0976]

[Chemical formula 562]

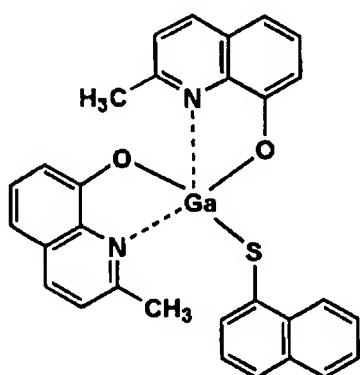
F1-1-19



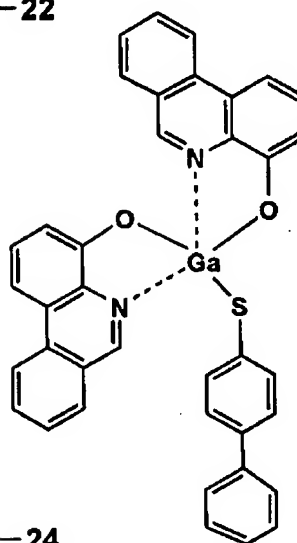
F1-1-20



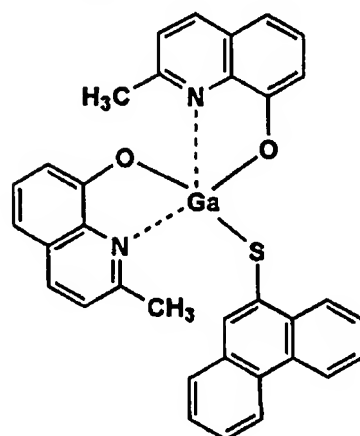
F1-1-21



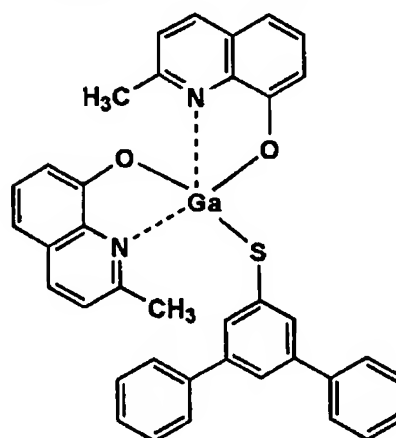
F1-1-22



F1-1-23



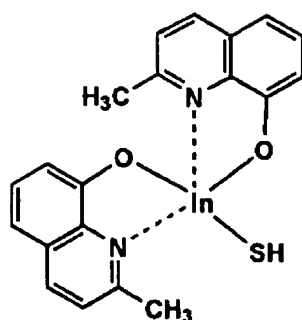
F1-1-24



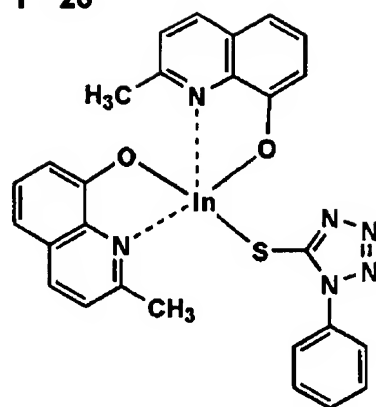
[0977]

[Chemical formula 563]

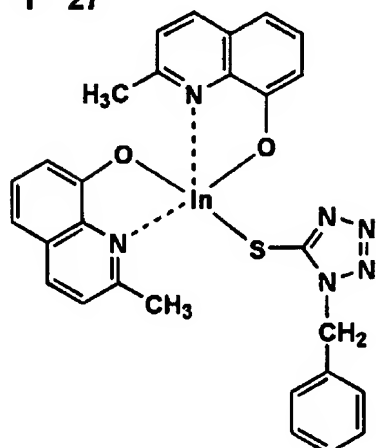
F1-1-25



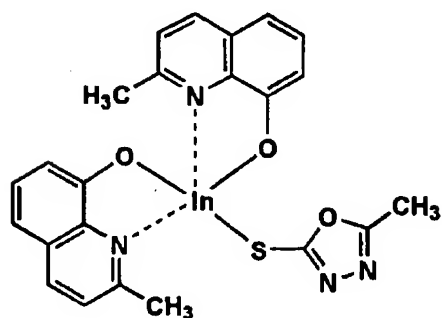
F1-1-26



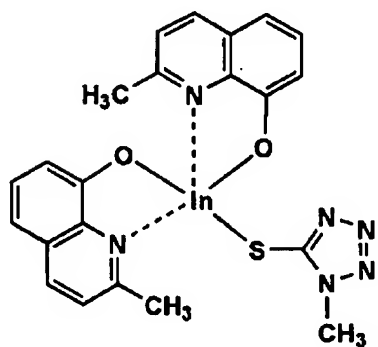
F1-1-27



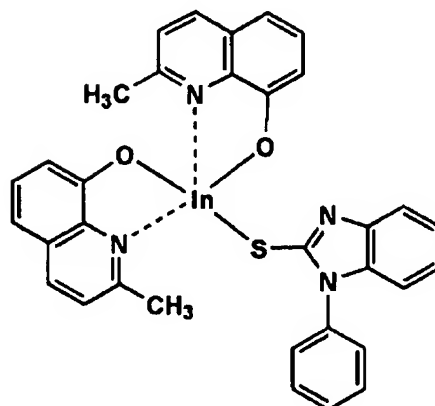
F1-1-28



F1-1-29

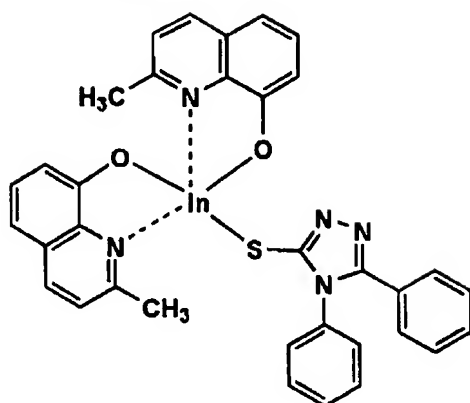
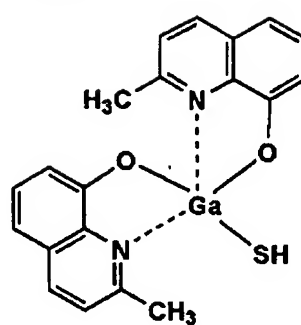
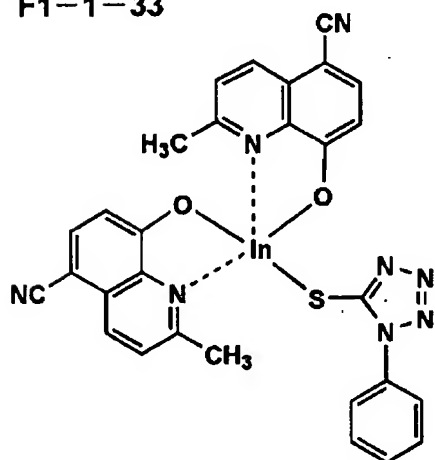
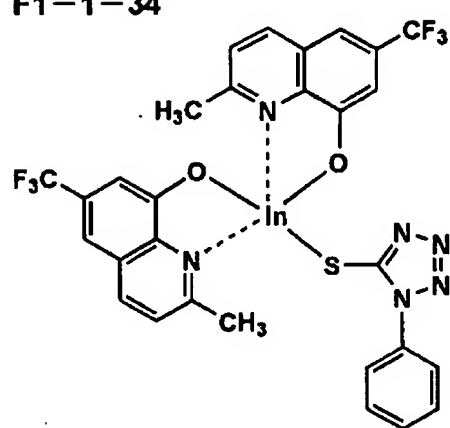


F1-1-30



[0978]

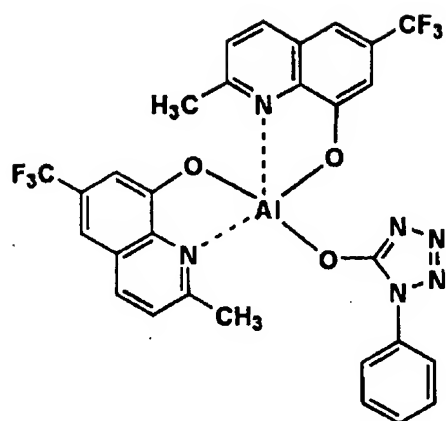
[Chemical formula 564]

**F1-1-31****F1-1-32****F1-1-33****F1-1-34**

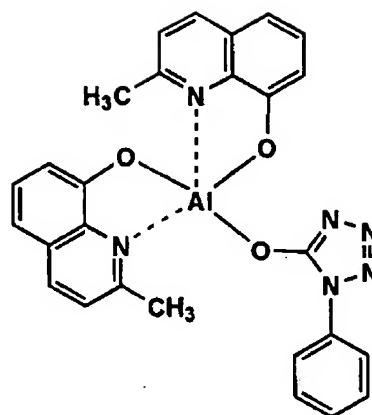
[0979]

[Chemical formula 565]

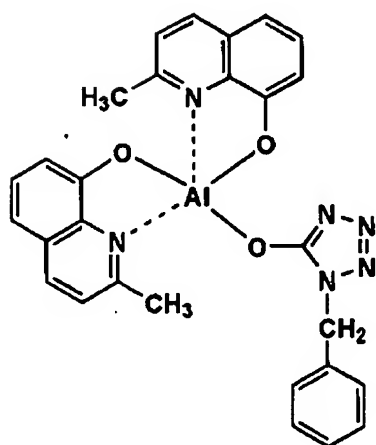
F1-2-1



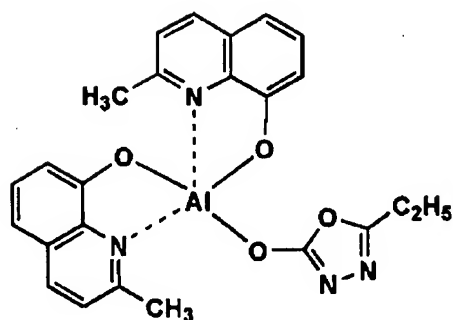
F1-2-2



F1-2-3



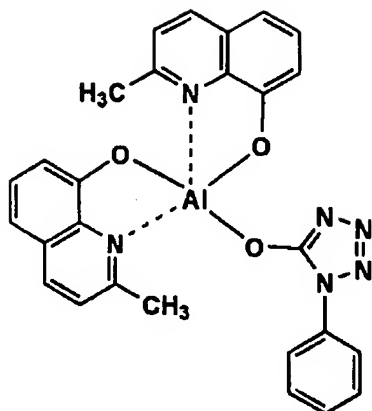
F1-2-4



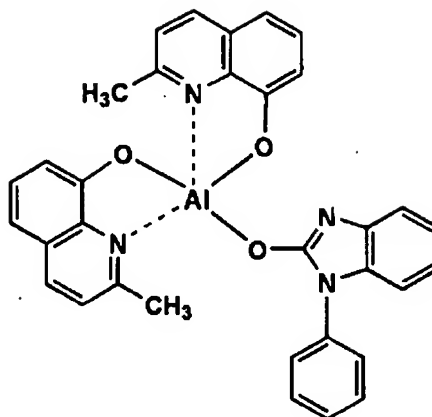
[0980]

[Chemical formula 566]

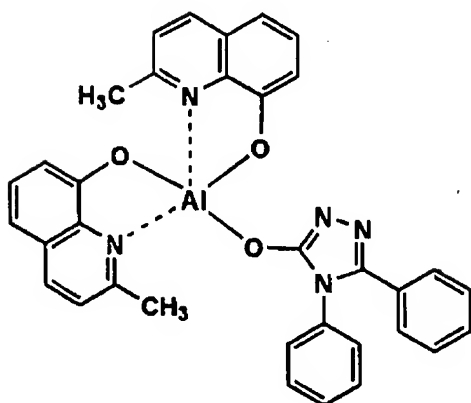
F1-2-5



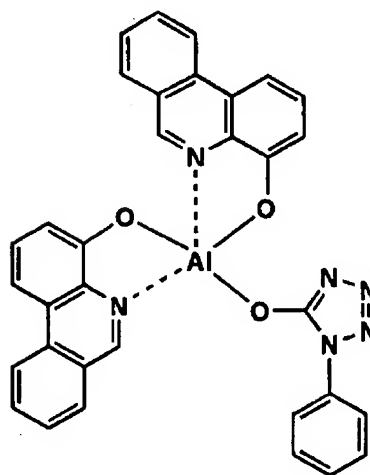
F1-2-6



F1-2-7



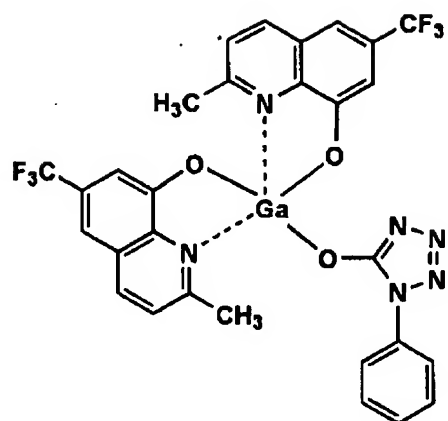
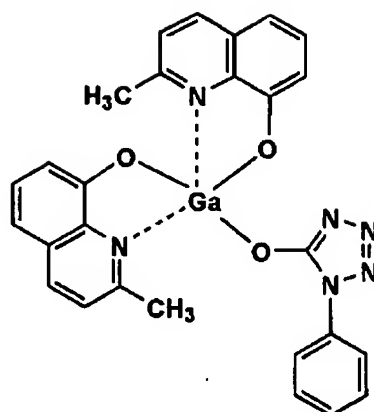
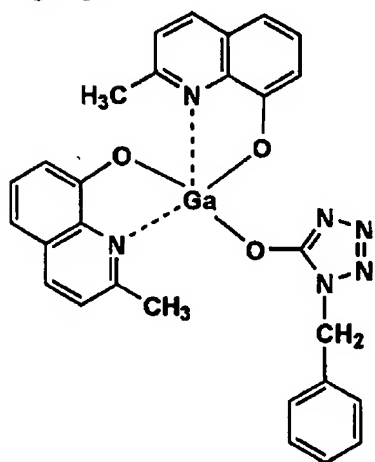
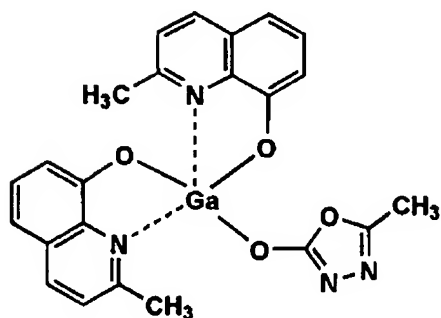
F1-2-8



[0981]

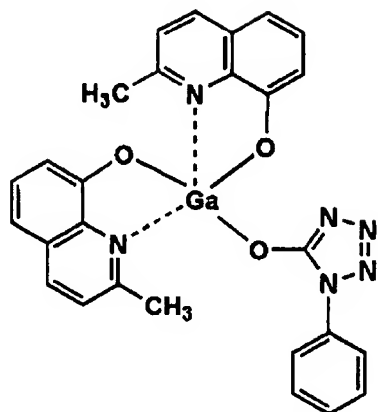
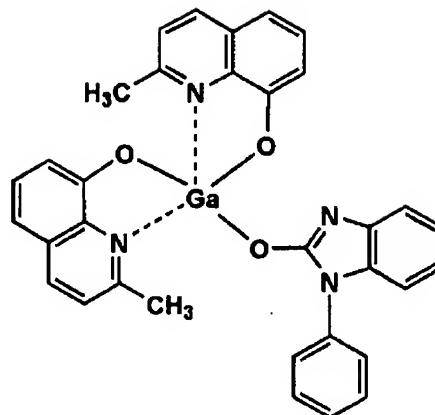
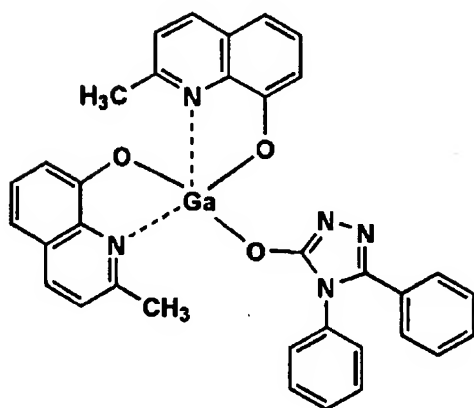
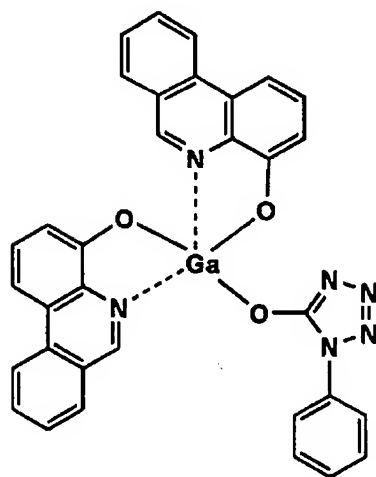


[Chemical formula 567]

**F1-3-1****F1-3-2****F1-3-3****F1-3-4**

[0982]

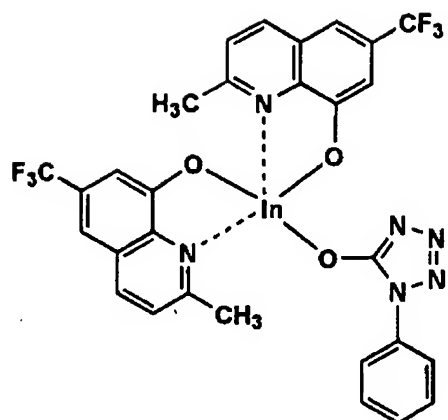
[Chemical formula 568]

**F1-3-5****F1-3-6****F1-3-7****F1-3-8**

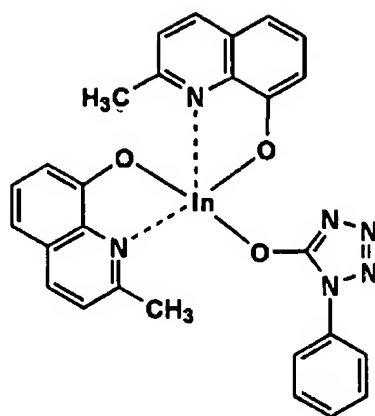
[0983]

[Chemical formula 569]

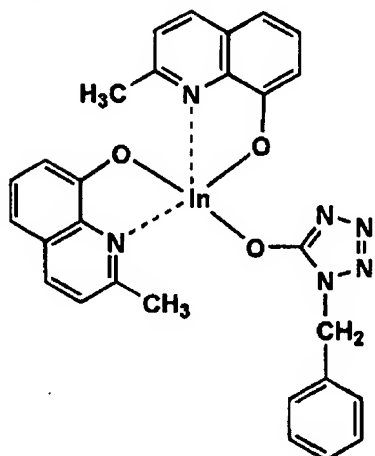
F1-3-9



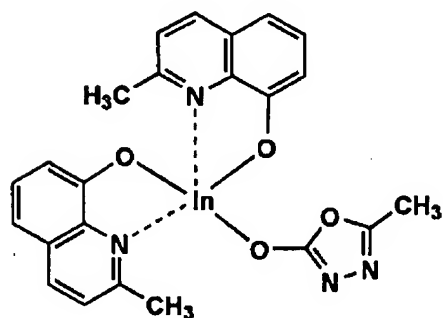
F1-3-10



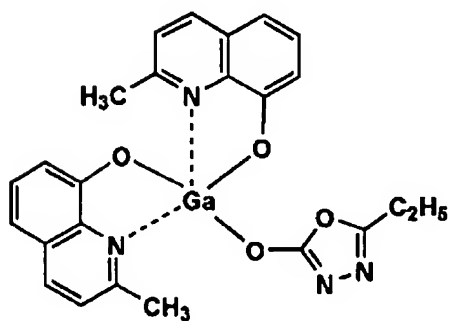
F1-3-11



F1-3-12



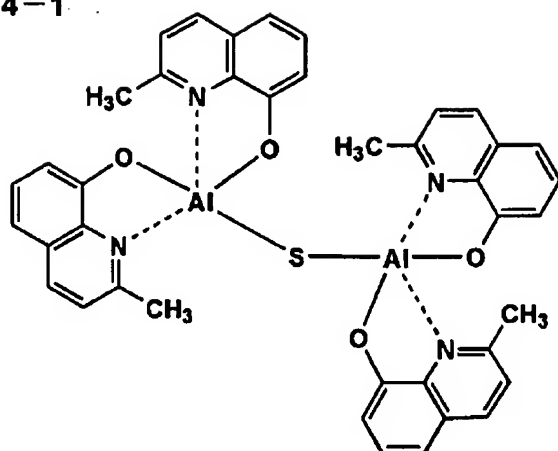
F1-3-13



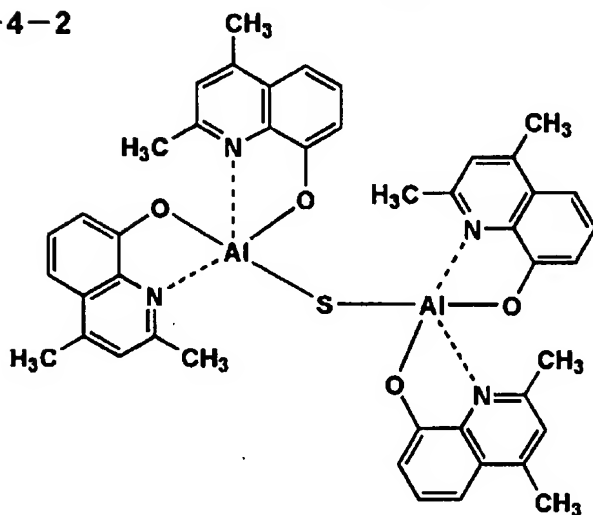
[0984]

[Chemical formula 570]

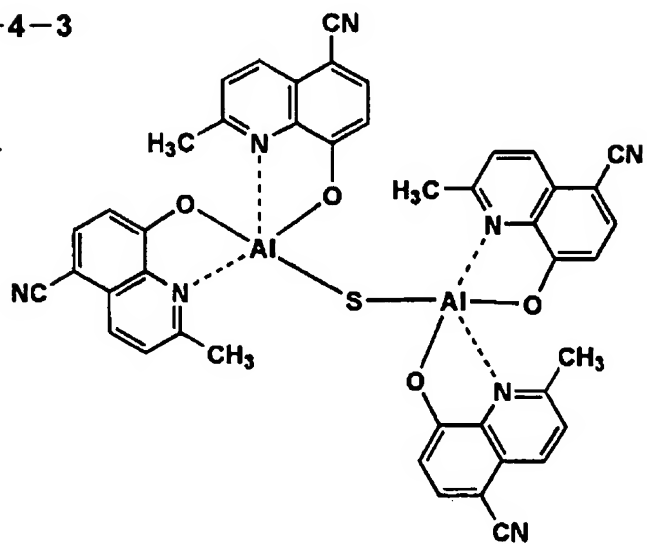
F1-4-1



F1-4-2



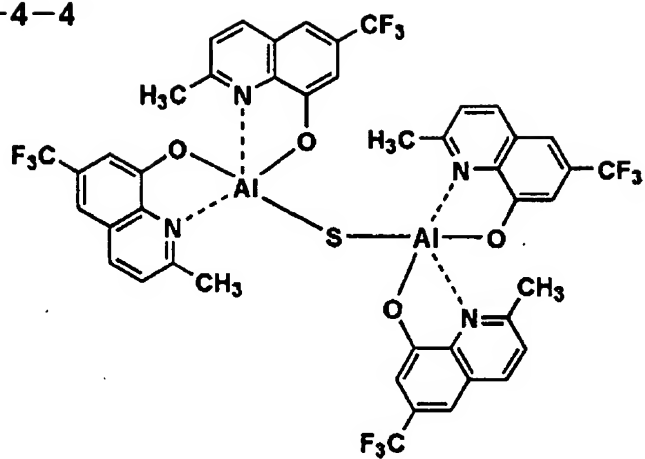
F1-4-3



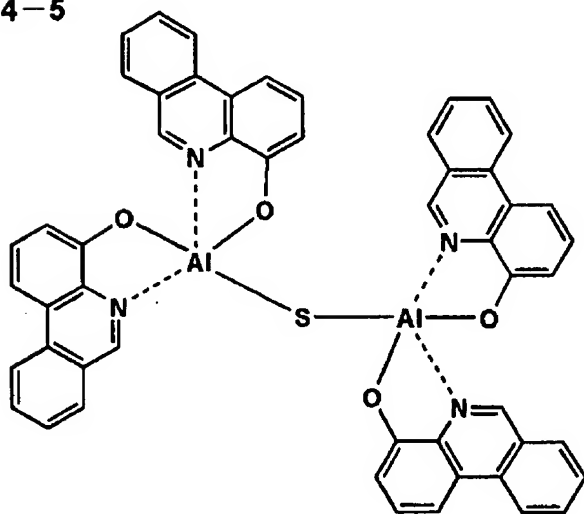
[0985]

[Chemical formula 571]

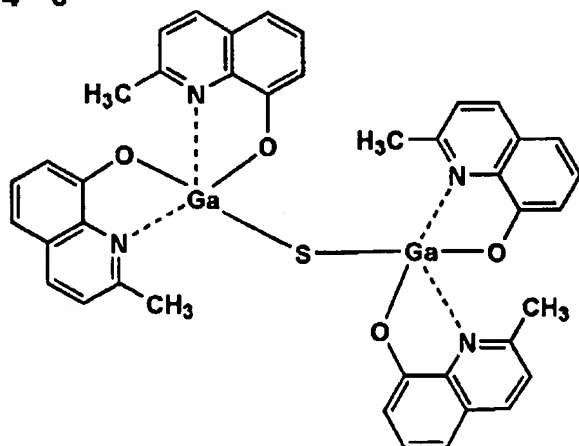
F1-4-4



F1-4-5



F1-4-6

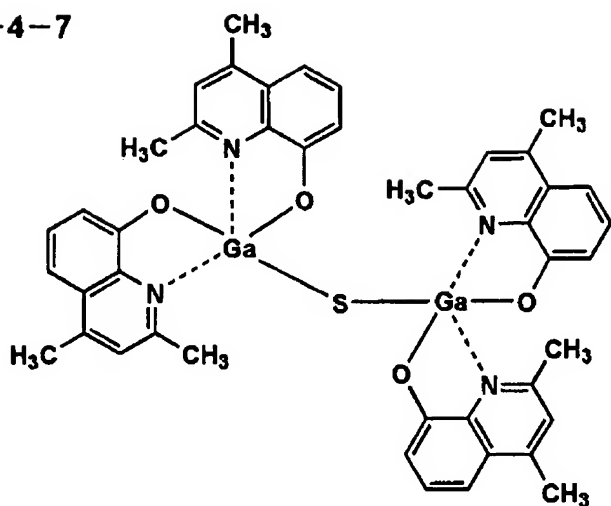




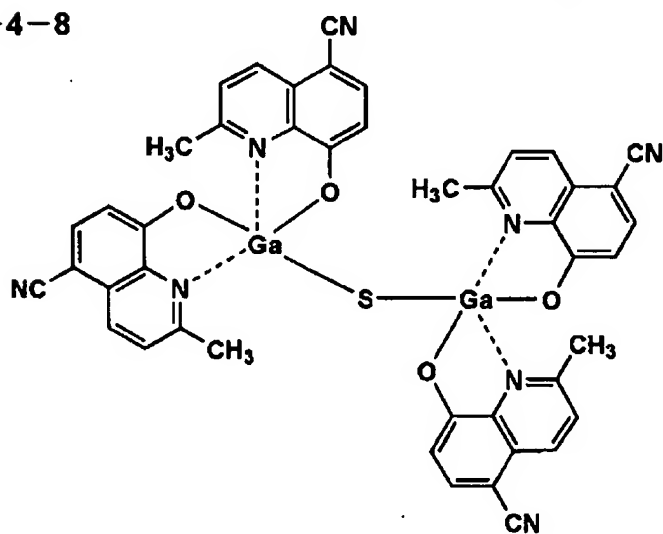
[0986]

[Chemical formula 572]

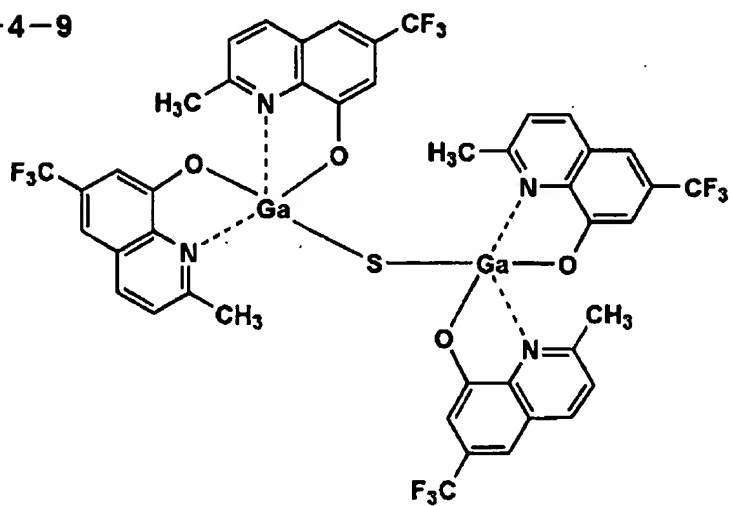
F1-4-7



F1-4-8



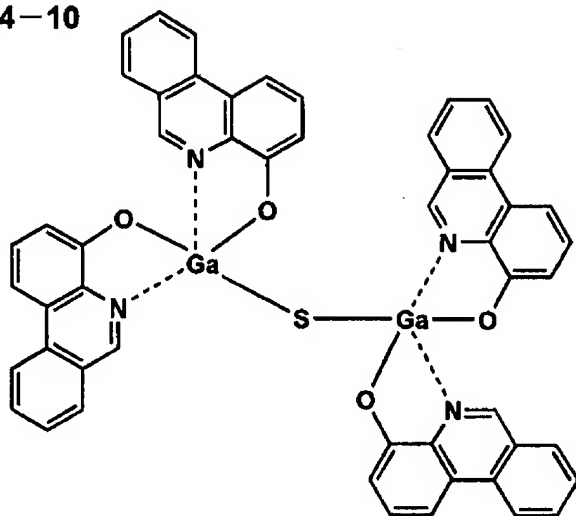
F1-4-9



[0987]

[Chemical formula 573]

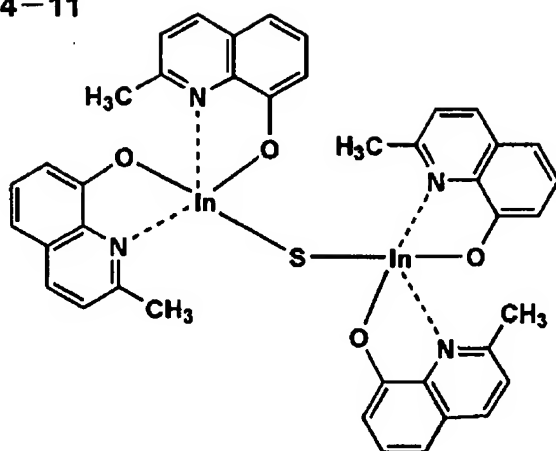
**F1-4-10**



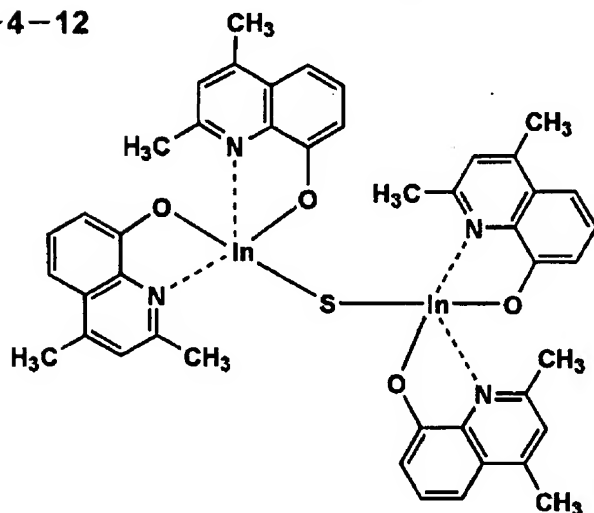
[0988]

[Chemical formula 574]

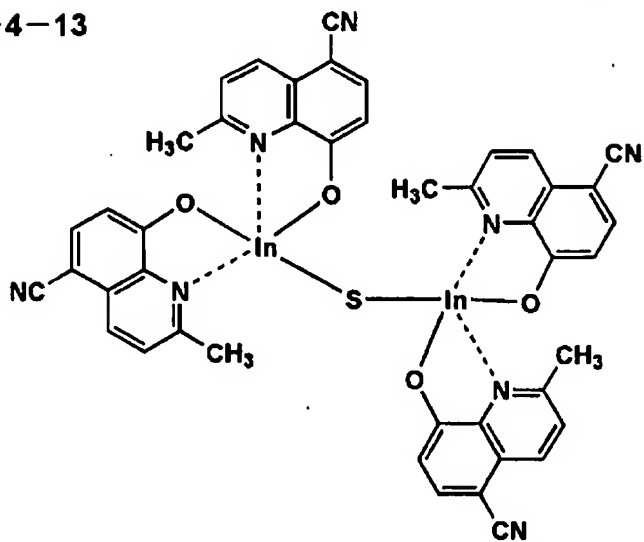
F1-4-11



F1-4-12



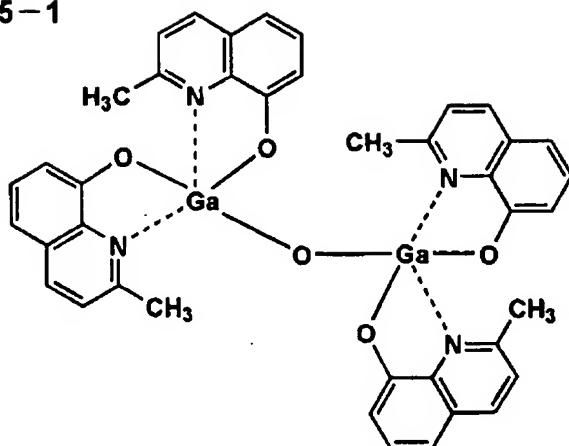
F1-4-13



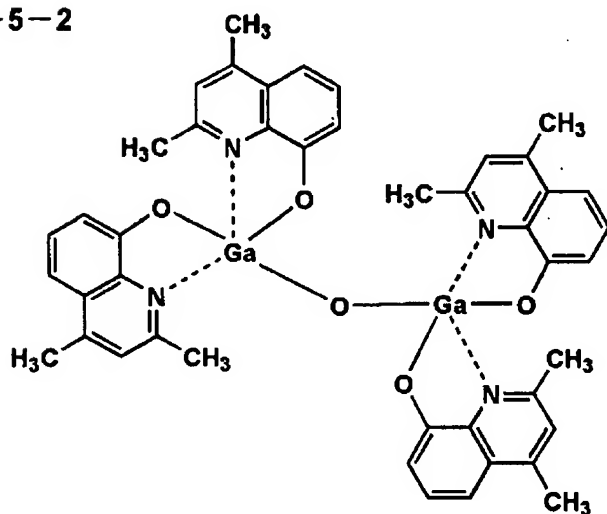
[0989]

[Chemical formula 575]

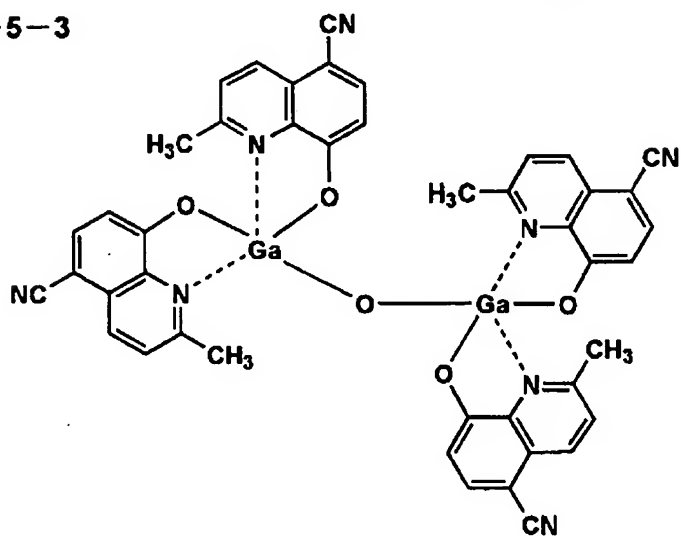
F1-5-1



F1-5-2



F1-5-3

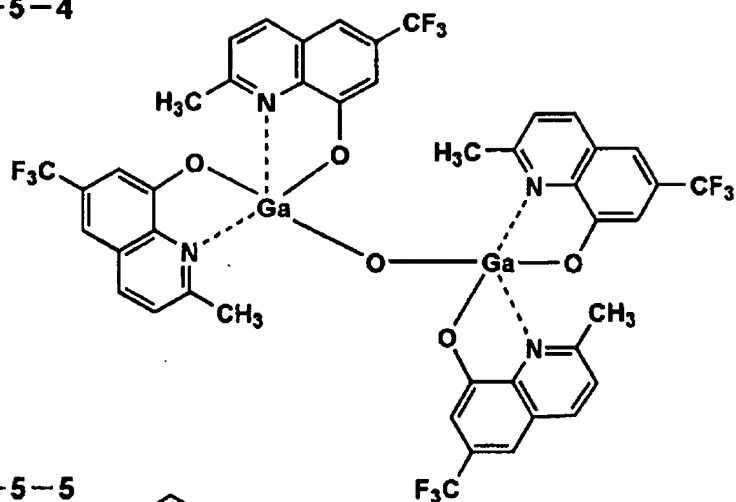


[0990]

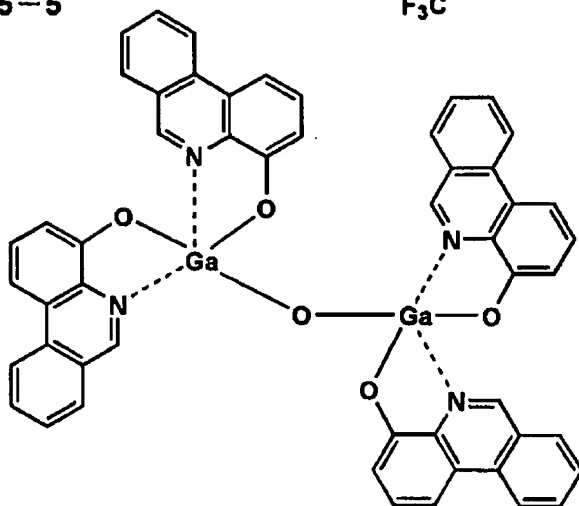
[Chemical formula 576]



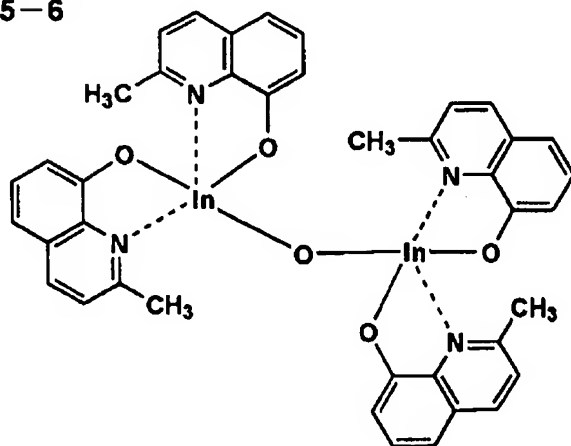
F1-5-4



F1-5-5

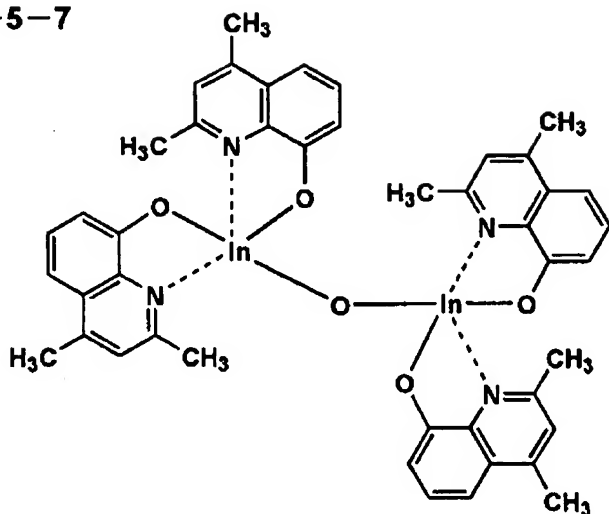


F1-5-6



[0991]

[Chemical formula 577]

**F1-5-7**

[0992]The example of typical manufacture of the compound of this invention is shown below. It can manufacture by a method with the same said of other compounds.

[0993](Synthetic example) Heating churning of 0.8 g of the samples of 2-methyl 8-KINORINORU was carried out in 40 ml of dehydrated ethanol solution containing 1.0 g of indium isopropoxide. About 30 minutes afterward, SERAITO filtration of the solution was carried out, and the insoluble matter was removed. \*\*\*\* -- the ethanol solution containing 0.8 g of samples and 1.1 g of CHIOFENORU of 2-methyl 8-KINORINORU was added, and heating flowing back was carried out, and it returned to room temperature, agitating for 4 hours, and washed by ethanol. The solid mass after air-drying was set to 1.0 g (\*\*\*\* is 37%).

[0994]It checked that it was a compound (F1-1-1) with the mass spectrum.

[0995]The metal complex compound which has the specific structure denoted by general formula (G1-1) - (G1-5) concerning this invention is explained.

[0996]In said general formula (G1-1),  $Z_{11}$  expresses an atomic group required to form a complex aromatic series ring with a carbon atom and a nitrogen atom,  $Z_{12}$  expresses an atomic group required to form a non-aromatic ring with a carbon atom, and M expresses metal. As an aromatic series ring formed by  $Z_{11}$ , a pyridine ring, a PIRIDAJIN ring, a pyrimidine ring, a pyrazine ring, a triazine ring, a benzimidazole ring, a BENZUCHI azole ring, a benzoxazole ring, a quinazoline ring, a lid RAJIN ring, etc. are mentioned, for example. As a non-aromatic ring formed by  $Z_{12}$ , the ring of a description is listed to below, for example.

[0997]

[Chemical formula 578]

**R-1**



**R-2**



**R-3**



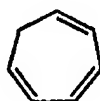
**R-4**



**R-5**



**R-6**



[0998]In a general formula (G1-1), the non-aromatic ring preferably denoted by  $Z_{12}$  is R-2 or R-6.

[0999]Next, a general formula (G1-2) is explained.

[1000]In a general formula (G1-2),  $Z_{21}$  and  $Z_{22}$  express an atomic group required to form an aromatic ring with a carbon atom and a nitrogen atom respectively, and M expresses metal. The aromatic ring as said  $Z_{11}$  with same aromatic ring formed by  $Z_{21}$  is mentioned, and a pyrrole ring, a pyrazole ring, an imidazole ring, a triazole ring, an indole ring, a benzimidazole ring, etc. are mentioned as an aromatic ring formed by  $Z_{22}$ , for example. Preferably, it is at the time of a pyrrole ring and a triazole ring.

[1001]Next, a general formula (G1-3) is explained.

[1002]In a general formula (G1-3),  $Z_{31}$  expresses an atomic group required to form an aromatic series ring with a carbon atom and a nitrogen atom,  $Z_{32}$  expresses the atomic group constituted with carbon and nitrogen required to form an aromatic series five-membered ring with a carbon atom, or an oxygen atom, and M expresses metal. [ as an aromatic series five-membered ring which the aromatic ring same as an aromatic ring formed by  $Z_{31}$  as said  $Z_{11}$  is mentioned, and is formed by  $Z_{32}$  ] For example, a pyrrole ring, a furan ring, an imidazole ring, a pyrazole ring, an oxazole ring, an oxadiazole ring, etc. can be mentioned, it is a nitrogen-containing aromatic ring preferably, and nitrogen or an oxygen atom is a nitrogen-containing aromatic ring contained more preferably. [ two or more ]

[1003]Next, a general formula (G1-4) is explained.

[1004]In a general formula (G1-4),  $Z_{41}$  expresses an atomic group required to form a ring with a carbon atom and a nitrogen atom,  $Z_{42}$  expresses an atomic group required to form a ring with a carbon atom, and M expresses metal. Although an aromatic ring or a non-aromatic ring may be sufficient as the aromatic ring which the aromatic ring as said  $Z_{11}$  with same aromatic ring formed by  $Z_{41}$  is mentioned, and is formed by  $Z_{42}$ , it is a non-aromatic ring preferably.

[1005]Next, a general formula (G1-5) is explained.

[1006]In a general formula (G1-5),  $Z_{51}$  expresses an atomic group required to form a complex aromatic series ring with a carbon atom and a nitrogen atom,  $Z_{52}$  expresses an atomic group required to form an AZUREN ring with a carbon atom, and M expresses metal. The aromatic ring as  $Z_{11}$  with same aromatic ring formed by  $Z_{51}$  is mentioned.

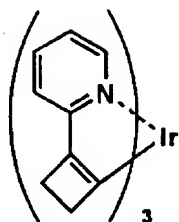
[1007]In general formula (G1-1) - (G1-5) which explained [ above-mentioned ],  $Z_{11}$ , It may have a substituent further, substituents may join together, and also the ring formed of  $Z_{12}$ ,  $Z_{21}$ ,  $Z_{22}$ ,  $Z_{31}$ ,  $Z_{32}$ ,  $Z_{41}$ ,  $Z_{42}$ ,  $Z_{51}$ , and  $Z_{52}$  may form a ring. In general formula (G1-1) - (G1-5), as for M, it is preferred that it is the metal of VIII \*\* in the periodic law table of an element, M is iridium, osmium, or platinum more preferably, and M is iridium most preferably.

[1008]Although the example of a compound denoted by general formula (G1-1) - (G1-5) below is given, this invention is not limited to these.

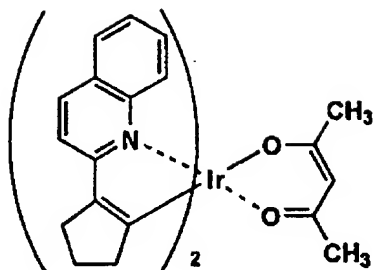
[1009]

[Chemical formula 579]

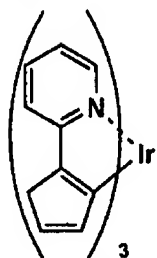
G1-1-1



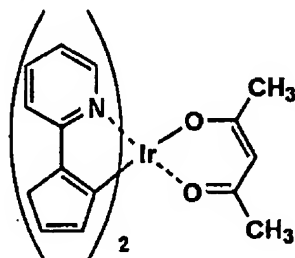
G1-1-2



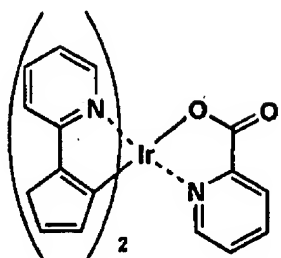
G1-1-3



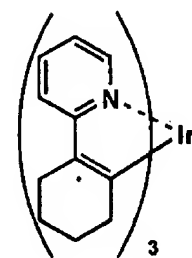
G1-1-4



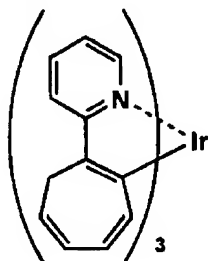
G1-1-5



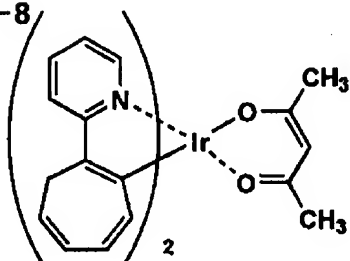
G1-1-6



G1-1-7



G1-1-8

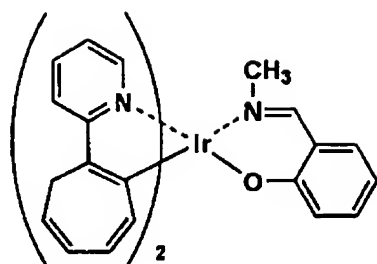


[1010]

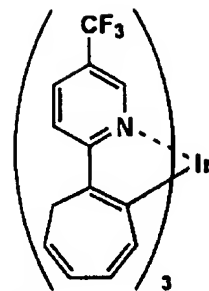
[Chemical formula 580]



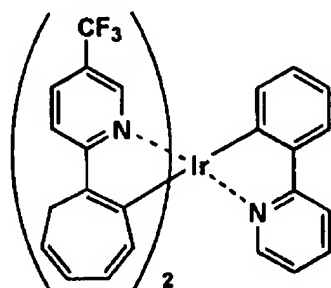
G1-1-9



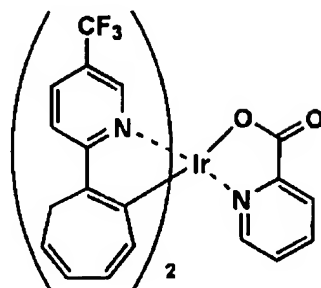
G1-1-10



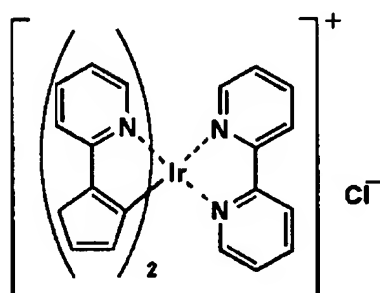
G1-1-11



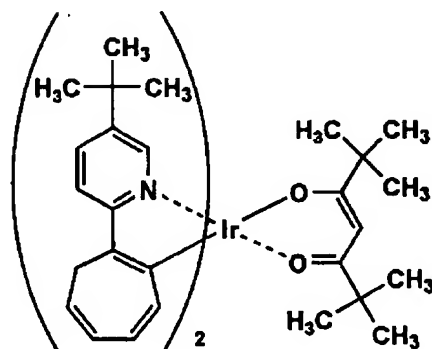
G1-1-12



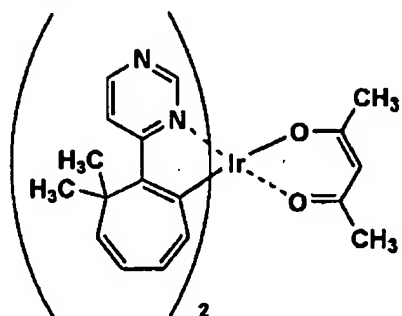
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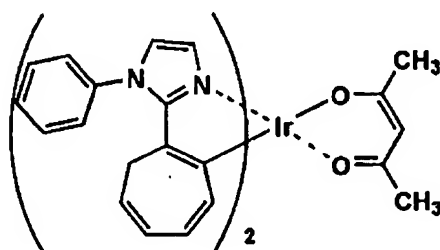
G1-1-14



G1-1-15



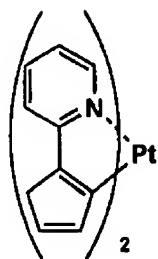
G1-1-16



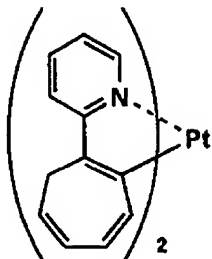
[1011]

[Chemical formula 581]

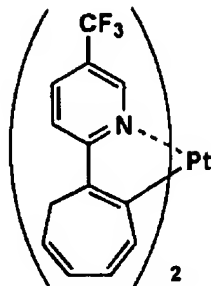
G1-1-17



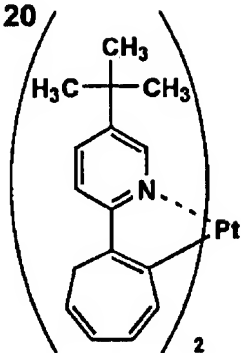
G1-1-18



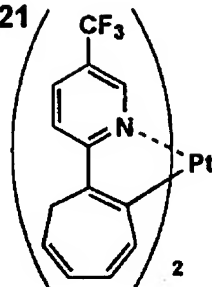
G1-1-19



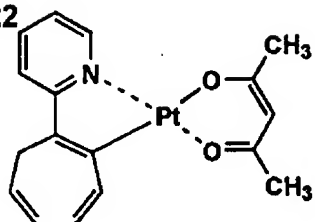
G1-1-20



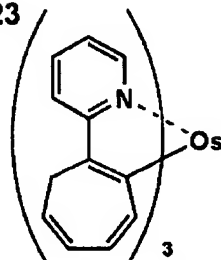
G1-1-21



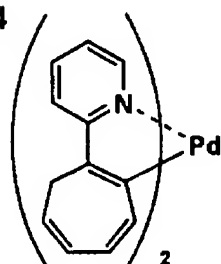
G1-1-22



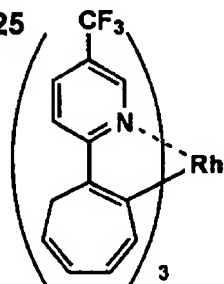
G1-1-23



G1-1-24



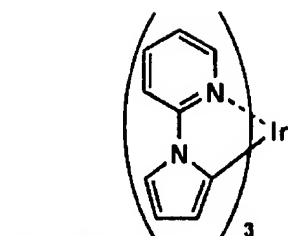
G1-1-25



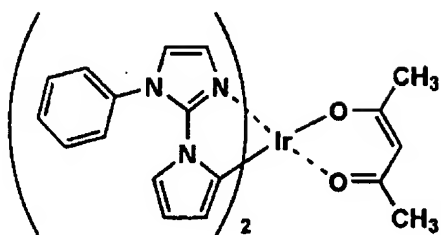
[1012]

[Chemical formula 582]

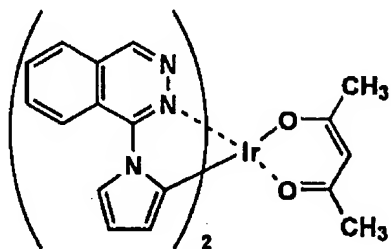
G1-2-1



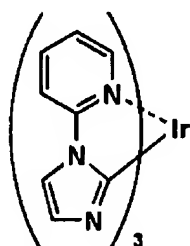
G1-2-3



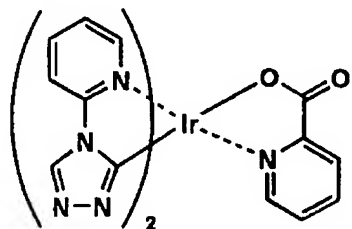
G1-2-5



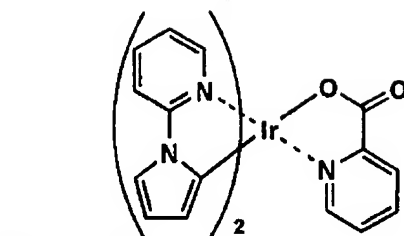
G1-2-7



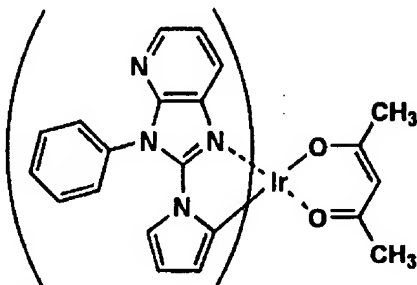
G1-2-9



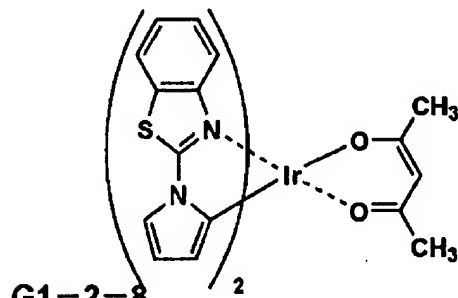
G1-2-2



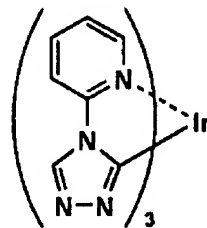
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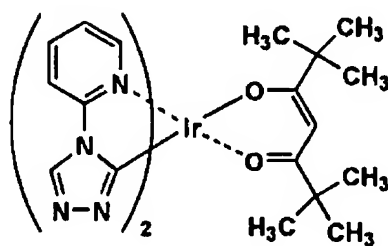
G1-2-6



G1-2-8



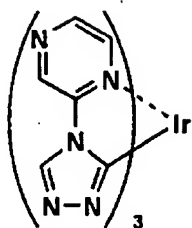
G1-2-10



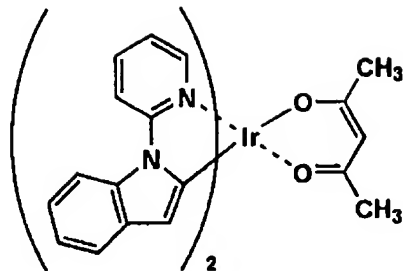
[1013]

[Chemical formula 583]

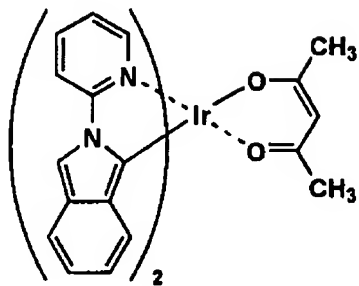
G1-2-11



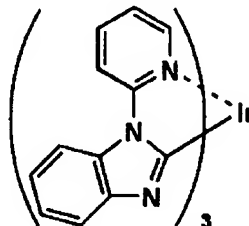
G1-2-12



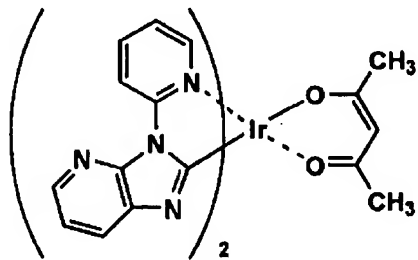
G1-2-13



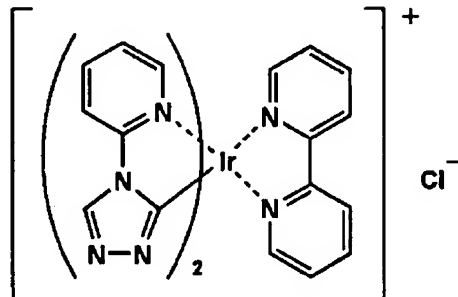
G1-2-14



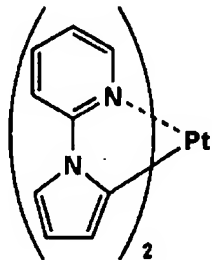
G1-2-15



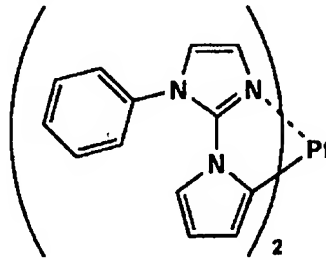
G1-2-16



G1-2-17



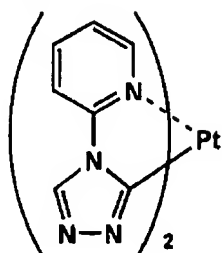
G1-2-18



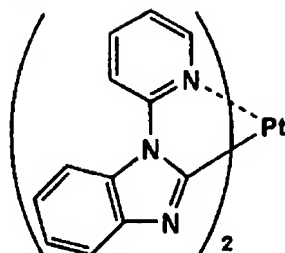
[1014]

[Chemical formula 584]

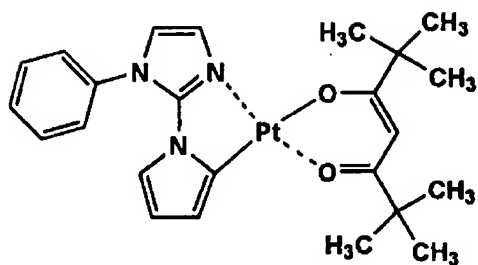
G1-2-19



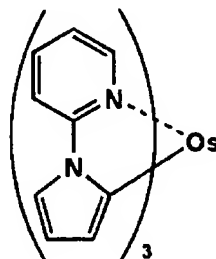
G1-2-20



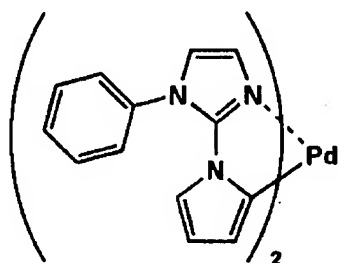
G1-2-21



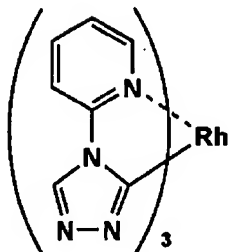
G1-2-22



G1-2-23



G1-2-24

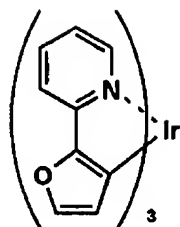


[1015]

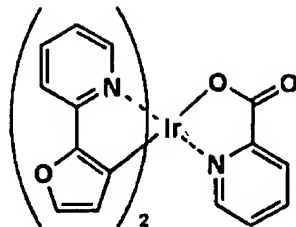


[Chemical formula 585]

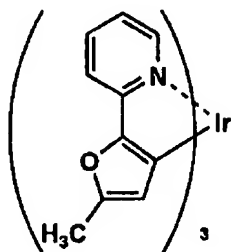
G1-3-1



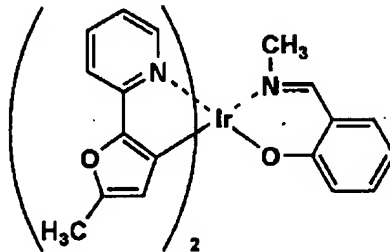
G1-3-2



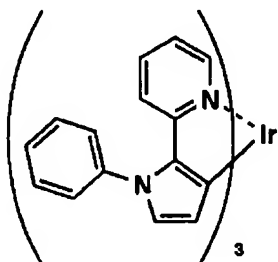
G1-3-3



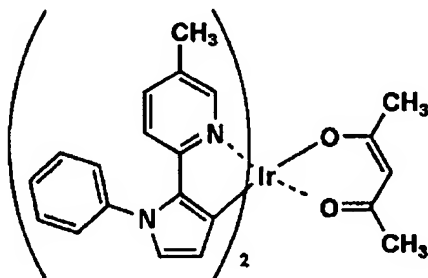
G1-3-4



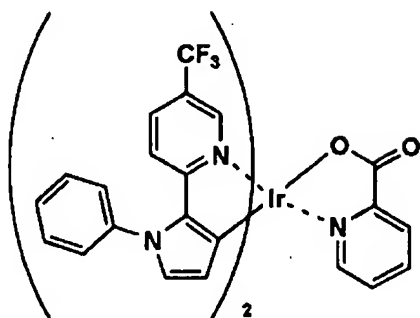
G1-3-5



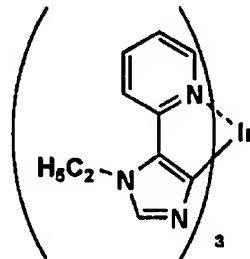
G1-3-6



G1-3-7



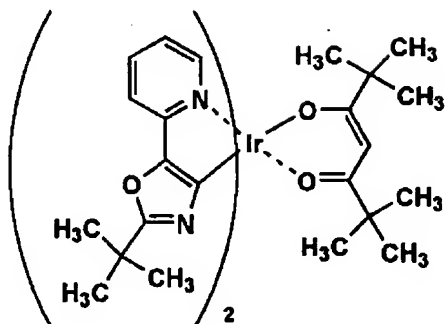
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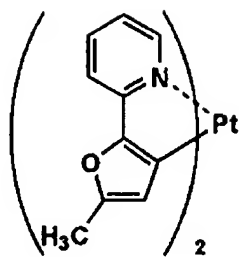
[1016]

[Chemical formula 586]

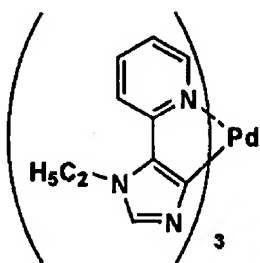
G1-3-9



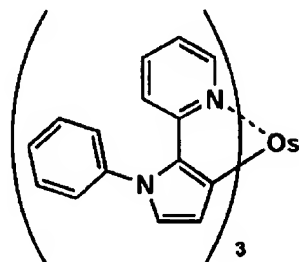
G1-3-10



G1-3-11

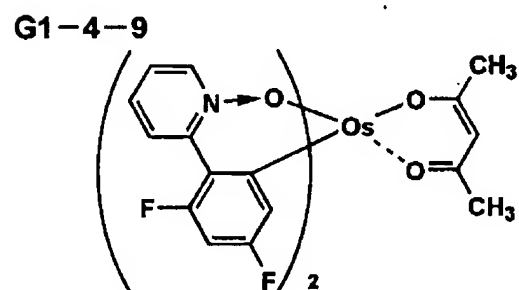
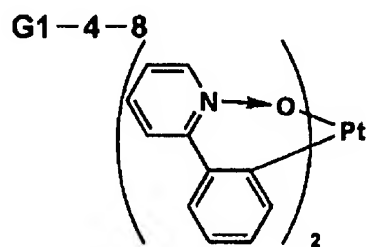
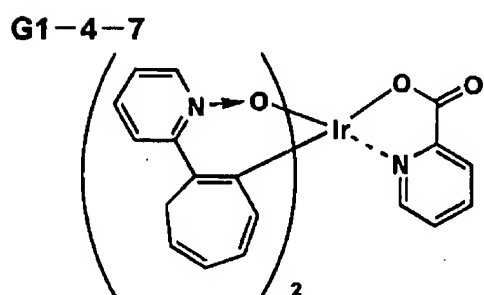
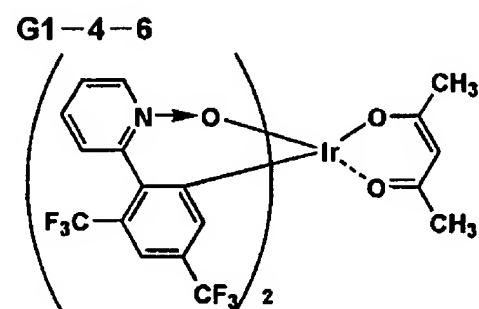
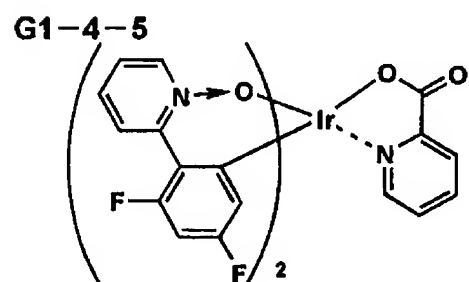
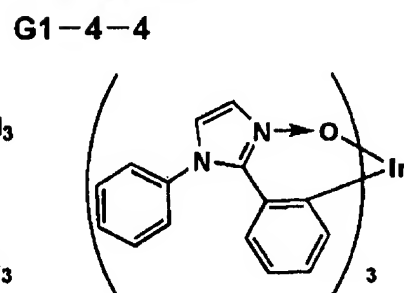
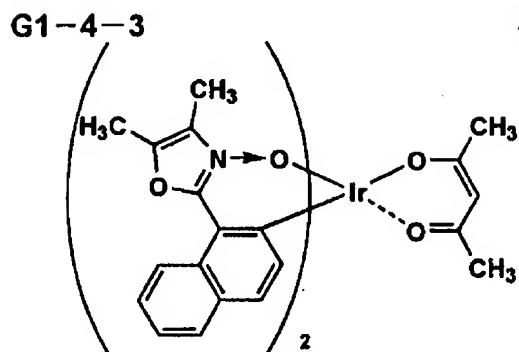
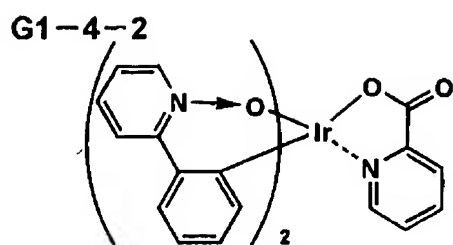
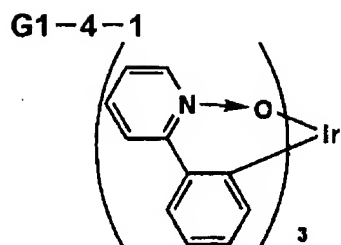


G1-3-12



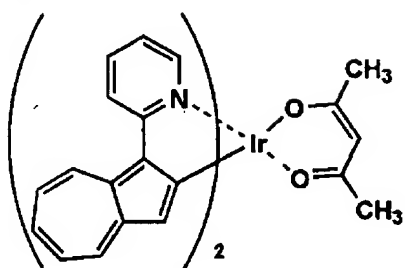
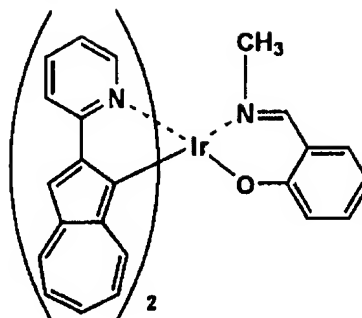
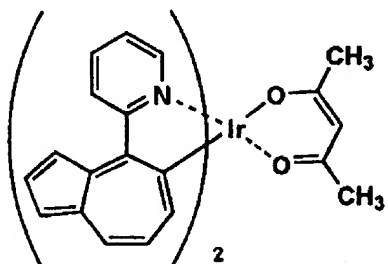
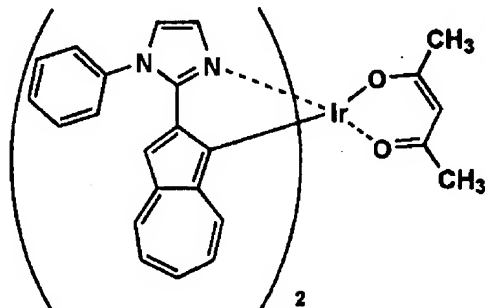
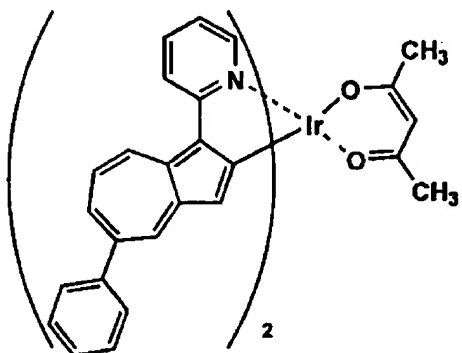
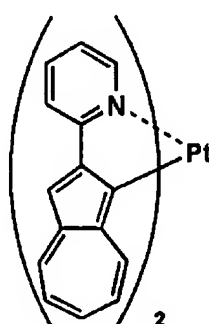
[1017]

[Chemical formula 587]



[1018]

[Chemical formula 588]

**G1-5-1****G1-5-2****G1-5-3****G1-5-4****G1-5-5****G1-5-6**

[1019][ the compound denoted by general formula (G1-1) - (G1-5) concerning this invention ]

In accordance with a publicly known method, it can compound by a person skilled in the art, for example, can obtain according to the synthetic example of the iridium complex of a description to J.Am.Chem.Soc., 123 volumes, 4304 pages (2001) and Inorg.Chem., 40 volumes, 1704 pages (2001), etc.

[1020]In the white luminescence organic electroluminescence element concerning this invention, The compound chosen from the compound denoted by said general formula (A1-1) - (F1-5), respectively, The polysilane compound which has a structure unit denoted by said general formula (C2-2) or (C2-3), the fluorogenic compound whose ratio (N/C) of the number of nitrogen atoms in the above and a molecule to the number of carbon atoms is 0.05 or less [ 0 or more ] -- further, Although the ratio [ as opposed to / as opposed to / in said fluorescence maximum wavelength / 415 nm or less / total of the hydrogen atom and fluorine atom in 500-2000, and a molecule in a molecular weight ] (F/(H+F)) of a fluorine atom may contain fluorogenic compounds which are 0-0.9 in which layer which constitutes an organic electroluminescence element, Said general formula (A1-1) - among the compounds denoted by said general formula (A1-1) - (F1-5) (A1-6), A general formula (A2-1) - (A2-7) a general formula (B1-1), a general formula (B1-6), A general formula (B1-11), a general formula (B1-13), a general formula (B-2-1) - (B-2-8) a general formula (B3-1) - (B3-2) a general formula (B4-1), a general formula (B5-1) - (B5-3) a general formula (B6-1) - (B6-2) a general formula (B7-1), a general formula (B8-1), General formula (B9-1), general formula (B10-1), and general formula (B11-1) - (B11-3), A general formula (C1-1-1), (C1-1-2), (C1-1-3), a general formula (C1-2-1), (C1-2-3), a general formula (C1-3) - (C1-7) a general formula (C1-8-1), (C1-8-2), general formula (C2-1), and general formula (C2-4) - (C2-7), General formula (C3-1) - (C3-4) general formula (C4-1), and general formula (C5-1) - (C5-2), General formula (C6-1) - (C6-V) general formula (C7-1) - (C7-4), A general formula (C8-1) - (C8-6) a general formula (C9-1), a general formula (C10-1), General formula (C11-1), general formula (C12-1), and general formula (D1-1) - (D1-6), General formula (D2-1) - (D2-6) general formula (D3-1) - (D3-6), As for at least one sort of compounds chosen from the compound denoted by the general formula (E1-1), the general formula (E1-5), a general formula (E2-1), and (E2-5), respectively, it is preferred to contain at least in any one layer of a luminous layer, an electron hole transportation layer, and the electron transport layer.

[1021]Said general formula (C2-2), the polysilane which has a structure unit denoted by (C2-3), The fluorogenic compound whose ratio (N/C) of the number of nitrogen atoms in said molecule to the number of carbon atoms is 0.05 or less [ 0 or more ], Or it is good for the ratio

[ as opposed to / as opposed to / in a fluorescence maximum wavelength / 415 nm or less / total of the hydrogen atom and fluorine atom in 500-2000, and a molecule in a molecular weight ] ( $F/(H+F)$ ) of a fluorine atom to make any one layer of a luminous layer, an electron hole transportation layer, and the electron transport layer contain the fluorogenic compound etc. which are 0-0.9, and to use them.

[1022]The above, general formula (A1-1) - (A1-6) general formula (A2-1) - (A2-7) especially, A general formula (B1-1), a general formula (B1-6), a general formula (B1-11), A general formula (B1-13), a general formula (B-2-1) - (B-2-8) a general formula (B3-1), (B3-2), general formula (B4-1), and general formula (B5-1) - (B5-3), A general formula (B6-1), (B6-2), a general formula (B7-1), a general formula (B8-1), General formula (B9-1), general formula (B10-1), and general formula (B11-1) - (B11-3), A general formula (C1-1-1), (C1-1-2), (C1-1-3), a general formula (C1-2-1), (C1-2-3), a general formula (C1-3) - (C1-7) a general formula (C1-8-1), (C1-8-2), general formula (C2-1), and general formula (C2-4) - (C2-7), A general formula (C3-1) - (C3-4) a general formula (C4-1), a general formula (C5-1), (C5-2), general formula (C6-I) - (C6-V) general formula (C7-1) - (C7-4) general formula (C8-1) - (C8-6) general formula (C9-1), general formula (C10-1), general formula (C11-1), general formula (C12-1), and general formula (D1-1) - (D1-6), Compounds denoted by general formula (D2-1) - (D2-6) and general formula (D3-1) - (D3-6), respectively are good to make any one layer of a luminous layer and the electron transport layer contain at least.

[1023]It is preferred to contain as a host compound especially in a luminous layer.

[1024]The polysilane which has the above and a structure unit expressed with the following general formula (C2-2) or (C2-3) to at least one layer, The fluorogenic compound whose ratio ( $N/C$ ) of the number of nitrogen atoms in a molecule to the number of carbon atoms is 0.05 or less [ 0 or more ], [ the ratio / as opposed to / as opposed to / in a fluorescence maximum wavelength / 415 nm or less / total of the hydrogen atom and fluorine atom in 500-2000, and a molecule in a molecular weight / ( $F/(H+F)$ ) of a fluorine atom ] [ fluorogenic compound / which are 0-0.9 ] It is desirable when it contains in either a luminous layer or an electron transport layer, and a white luminescence organic electroluminescence element is constituted. It is preferred to contain as a host compound especially in a luminous layer.



[1025]In the white luminescence organic electroluminescence element concerning this invention, About the compound denoted by the above, a general formula (E1-1), the general formula (E1-5), the general formula (E2-1), and a general formula (E2-5), respectively, when an electron hole transportation layer is made to contain, it is desirable, and it is the compound outstanding as an electron hole transportation substance.

[1026]The above, general formula (D1-1) - (D1-6) general formula (D2-1) - (D2-6), About the compound denoted by general formula (D3-1) - (D3-6) and general formula (F1-1) - (F1-5), respectively, it is preferred to make an electron hole prevention layer (electron transport layer) contain, and it forms the outstanding electron hole block layer.

[1027]As mentioned above, the fluorogenic compound concerning this invention has high luminescence luminosity by using in the aforementioned desirable mode, respectively, and the organic electroluminescence element which attained the improvement in luminous efficiency and durable coexistence is provided.

[1028]In this invention, said fluorogenic compound is used with a dopant compound as a host compound, when using in a luminous layer, but. The "host compound" as used in this invention means most compounds of the mixture ratio (mass) in the luminous layer which comprises two or more sorts of compounds, and it is called a "dopant compound" about the other compound. For example, a luminous layer is constituted from two sorts called the compound A and the compound B, if the mixture ratio is A:B=10:90, the compound A is a dopant compound and the compound B is a host compound. A luminous layer is constituted from three sorts, the compound A, the compound B, and the compound C, if the mixture ratio is A:B:C=5:10:85, the compound A and the compound B are dopant compounds, and the compound C is a host compound. Therefore, the phosphorescence compound in this invention is a kind of a dopant compound.

[1029]The "phosphorescence compound" in this invention is a compound in which luminescence from an excitation Mie paragraph is observed, and phosphorescence quantum \*\*\*\* are 0.001 or more compounds in 25 \*\*. Phosphorescence quantum \*\*\*\* is 0.1 or more still more preferably 0.01 or more preferably.

[1030]The above-mentioned phosphorescence quantum \*\*\*\* can be measured by the method of a 398 pages (1992 editions, Maruzen) description of the spectrum II of the 4th edition experimental science lecture 7. Although phosphorescence quantum \*\*\*\* in the inside of solution can be measured using various solvents, the phosphorescence compound used for this invention is set they to be [ any of arbitrary solvents ], and the above-mentioned phosphorescence quantum \*\*\*\* should just be attained.

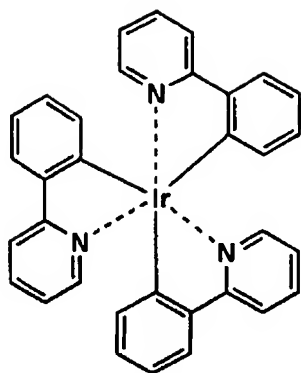
[1031]Preferably, as a phosphorescence compound used by this invention, are the metal of VIII \*\* a complex system compound to contain, and in the periodic law table of an element still more preferably, It is an iridium compound, an osmium compound, or a platinum compound (platinum complex system compound), and an iridium compound is especially the most preferred.

[1032]Although the example of the phosphorescence compound used for below by this invention is shown, it is not limited to these. These compounds are compoundable to Inorg.Chem.40 volume, and 1704-1711 by the method of a description, etc., for example.

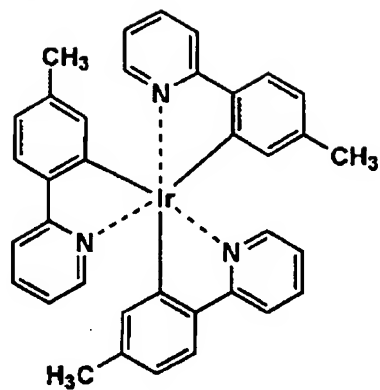
[1033]

[Chemical formula 589]

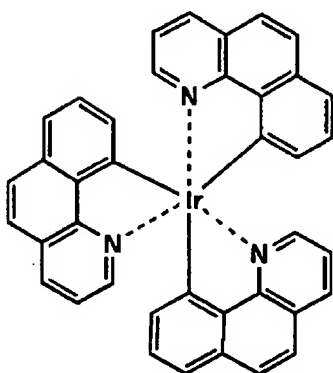
Ir-1



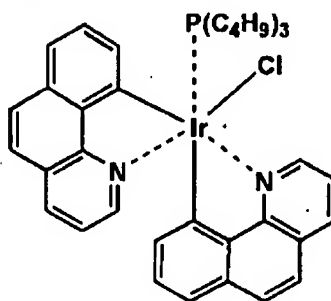
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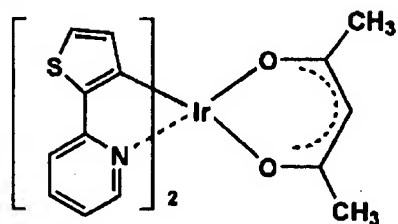
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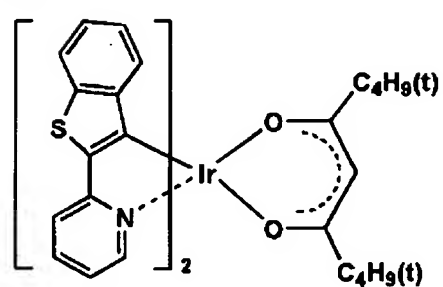
Ir-4



Ir-5



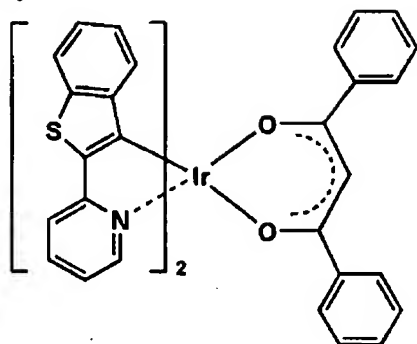
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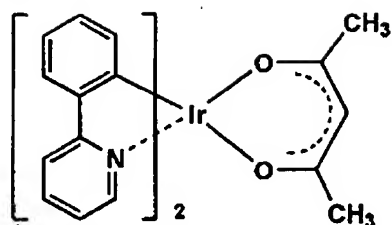
[1034]

[Chemical formula 590]

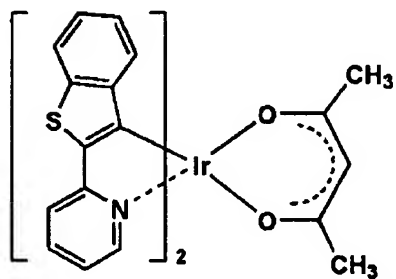
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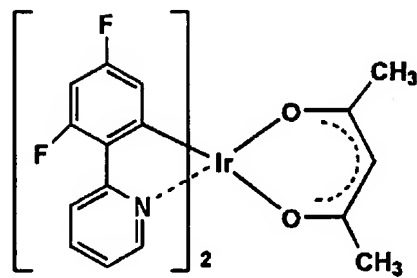
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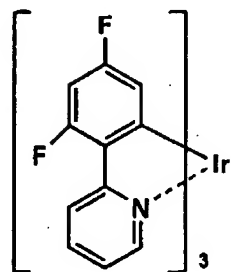
Ir-9



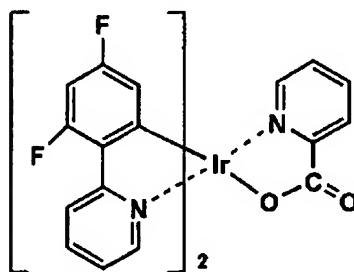
Ir-10



Ir-11



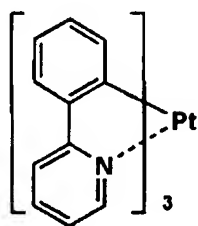
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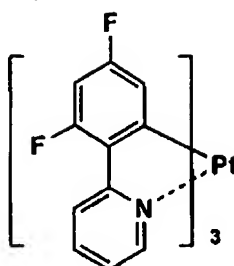
[1035]

[Chemical formula 591]

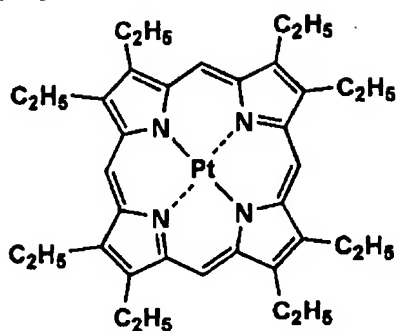
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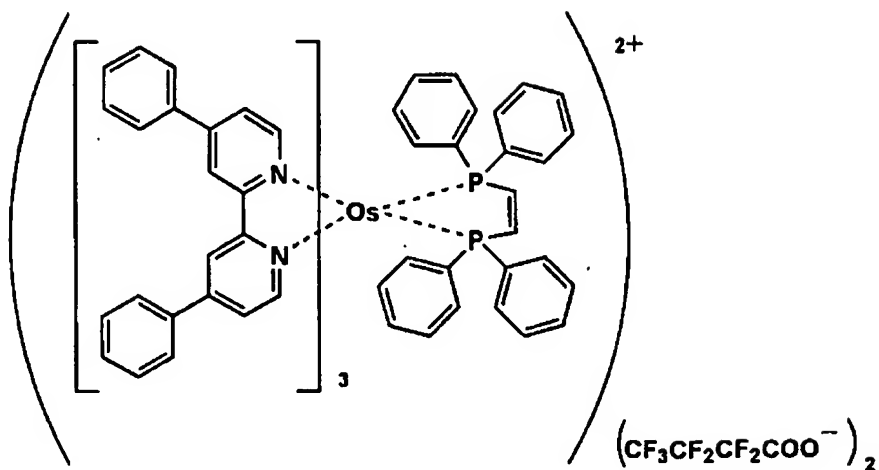
Pt-2



Pt-3



A-1



[1036]In the white luminescence organic EL device concerning this invention, especially it is used with said host compound, as a desirable phosphorescence compound, it is a compound denoted by said general formula (G1-1) - (G1-5).

[1037]In another form, at least one sort of fluorogenic compounds which have a fluorescence maximum wavelength to a field [ long wave / maximum wavelength / of luminescence from a phosphorescence compound ] at everything but a host compound and a phosphorescence compound may be contained. In this case, as for electric field luminescence as an organic EL device, luminescence from a fluorogenic compound is obtained by the energy transmission from a host compound and a phosphorescence compound. One desirable as a fluorogenic compound has a high fluorescence quantum yield in the state of solution. Here, not less than 30% of especially a fluorescence quantum yield is desirable not less than 10%. A concrete fluorogenic compound A coumarin series pigment, a pyran series pigment, cyanine dye, A crocodile NIUMU system pigment, a SUKUARIUMU system pigment, an oxo Benz anthracene system pigment, a fluorescein system pigment, rhodamine dye, a PIRIRIUMU system pigment, a perylene pigment, a stilbene series pigment, the poly CHIOFEN system pigment, or a rare earth complex system fluorescent substance is mentioned.

[1038]A fluorescence quantum yield here can also be measured by the method of a 362 pages (1992 editions, Maruzen) description of the spectrum II of said 4th edition experimental science lecture 7.

[1039]The above phosphorescence quantum \*\*\*\* are 0.001 or more in 25 \*\*, and also said phosphorescence compound has a phosphorescence luminescence maximum wavelength longer than the fluorescence maximum wavelength of the fluorogenic compound which serves as said host. EL element which used luminescence of the phosphorescence compound, i.e., a triplet state, by this using the phosphorescence compound of a long wave from the luminescence maximum wavelength of the fluorogenic compound which serves as a host and which carries out electric field luminescence in a long wave rather than the fluorescence maximum wavelength of a host compound can be obtained. Therefore, it is not restricted especially as a phosphorescence luminescence maximum wavelength of the

phosphorescence compound used, and the luminescence wavelength theoretically obtained because at least a central metal and \*\* choose a child and at least \*\* chooses a child's substituent etc. can be changed.

[1040]For example, the organic EL device which carries out electric field luminescence can be obtained to a green field by using the iridium complex which has phosphorescence to a green field, using the fluorogenic compound which has a fluorescence maximum wavelength to a 350-440-nm field as a host compound.

[1041][ the color in which the fluorogenic compound and phosphorescence compound of this Description emit light ] In 108-page drawing 4 .16 of a "new edition color science handbook" (the edited by Color Science Association of Japan, University of Tokyo Press, 1985), it is determined by a color when the result measured by spectrum radiation luminance meter CS-1000 (made by Minolta) is applied to a CIE chromaticity coordinate.

[1042]<<Composition layer of an organic EL device>> The fundamental composition layer of an organic EL device is explained.

[1043]In this invention, although the desirable example of the layer composition of an organic EL device is shown below, this invention is not limited to these. (i) An anode / luminous layer / electron transport layer / negative pole. (ii) An anode / electron hole transportation layer / luminous layer / electron transport layer / negative pole. (iii) An anode / electron hole transportation layer / luminous layer / electron hole prevention layer / electron transport layer / negative pole (iv) anode / electron hole transportation layer / luminous layer / electron hole prevention layer / electron transport layer / negative pole buffer layer / negative pole (v) anode / anode buffer layer / electron hole transportation layer / luminous layer / electron hole prevention layer / electron transport layer / negative pole buffer layer / negative pole <<anode>>. What uses a large (not less than 4 eV) metal, the alloy, the electrical conductivity compounds, and these mixtures of a work function as an electrode substance as an anode in an organic EL device is used preferably. As an example of such an electrode substance, conductive transparent materials, such as metal, such as Au, CuI, indiumtin oxide (ITO),  $\text{SnO}_2$ , and ZnO, are mentioned. Materials which can produce [ that it is amorphous and ] a transparent conductive film, such as IDIXO ( $\text{In}_2\text{O}_3$ -ZnO), may be used. An anode these

electrode substances with methods, such as vapor deposition and sputtering, When a thin film may be made to form, and the pattern of desired shape may be formed with the photolithographic method or you seldom need pattern accuracy, it may form a pattern via the mask of desired shape at the time of vapor deposition and sputtering of (about not less than 100 micrometers) and the above-mentioned electrode substance. When taking out luminescence from this anode, it is desirable to make transmissivity larger than 10%, and below hundreds of ohms /  $\square$  of the sheet resistance as an anode are preferred. Although film thickness is based also on material, 10-1000 nm is usually preferably chosen in 10-200 nm.

[1044]The <<negative pole>> What, on the other hand, uses a small (4 eV or less) metal (electron injectional metal is called), the alloy, the electrical conductivity compounds, and these mixtures of a work function as an electrode substance as the negative pole is used. As an example of such an electrode substance, sodium, a sodium potassium alloy, Magnesium, lithium, magnesium / copper mixture, magnesium / silver mixture, Magnesium / aluminum mixture, magnesium / indium mixture, aluminum / aluminum oxide ( $\text{aluminum}_2\text{O}_3$ ) mixture, indium, lithium / aluminum mixture, a rare earth metal, etc. are mentioned. A mixture with the second metal that is the durable point over electronic pouring nature, oxidization, etc. to electron injectional metal, and metal with it in these, [ a large value of a work function, and ] [ more stable than this ] For example, magnesium / silver mixture, magnesium / aluminum mixture, magnesium / indium mixture, aluminum / aluminum oxide ( $\text{aluminum}_2\text{O}_3$ ) mixture, lithium / aluminum mixture, aluminum, etc. are preferred. The negative pole can produce these electrode substances by making a thin film form by methods, such as vapor deposition and sputtering. Below hundreds of ohms /  $\square$  of the sheet resistance as the negative pole are preferred, and 10 nm - 1000 nm of film thickness is usually preferably chosen in 50 nm - 200 nm. In order to make luminescence penetrate, if either one of the anode of an organic EL device or the negative pole is transparent or translucent, luminescence luminosity improves and it is convenient.

[1045]Next, the pouring layer used as a composition layer of the organic EL device of this invention, an electron hole transportation layer, an electron transport layer, etc. are explained.

[1046]<<Pouring layer>>: An electronic injection layer and a hole injection layer pouring layer are provided if needed, have an electronic injection layer and a hole injection layer, and may be made to exist like the above between an anode, a luminous layer, or an electron hole



transportation layer and between the negative pole, a luminous layer, or an electron transport layer.

[1047]A pouring layer is a layer provided between an electrode and an organic layer for a drive voltage fall or the improvement in luminescence luminosity, It is indicated in detail in piece [ 2nd ] chapter "electrode material" (123-166 pages) "organic EL device and its industrialization front line (November 30, 1998 N tea S company issue)" 2, and there are a hole injection layer (anode buffer layer) and an electronic injection layer (negative pole buffer layer).

[1048]As for the anode buffer layer (hole injection layer), the details are indicated in JP,H9-45479,A, a 9-260062 gazette, a 8-288069 gazette, etc.

The phthalocyanine buffer layer represented by copper phthalocyanine as an example, The polymer buffer layer using conductive polymers, such as the oxide buffer layer, the amorphous carbon buffer layer and poly aniline (EMERARUDIN) which are represented by vanadium oxide, and poly CHIOFEN, etc. are mentioned.

[1049]As for the negative pole buffer layer (electronic injection layer), the details are indicated in JP,H6-325871,A, a 9-17574 gazette, a 10-74586 gazette, etc.

The metal buffer layer specifically represented by strontium, aluminum, etc., The alkali metal compound buffer layer represented by lithium fluoride, the alkaline-earth-metals compound buffer layer represented by magnesium fluoride, the oxide buffer layer represented by the aluminum oxide, etc. are mentioned.

[1050]As for the above-mentioned buffer layer (pouring layer), it is desirable that it is a very thin film, and although based also on a material, the film thickness has the preferred range of 0.1 nm - 100 nm.

[1051]A prevention layer is provided like the above if needed besides the basic composition layer of an organic compound thin film. For example, there is an electron hole prevention (hole block) layer indicated to 237 pages of JP,H11-204258,A, 11-204359, and "an organic EL

device and its industrialization front line (November 30, 1998 N tea S company issue)", etc.

[1052]The recombination probability of an electron and an electron hole can be raised by preventing an electron hole, an electron hole prevention layer being an electron transport layer in a large meaning, and the capability to convey an electron hole consisting of a remarkable small material, having the function to convey an electron, and conveying an electron.

[1053]About the compound denoted by above, general formula (D1-1) - (D1-6) general formula (D2-1) - (D2-6) general formula (D3-1) - (D3-6) and general formula (F1-1) - (F1-5), respectively, it used for the electron hole prevention layer, and the advantageous thing was described.

[1054]The recombination probability of an electron and an electron hole can be raised by preventing an electron, an electronic prevention layer being an electron hole transportation layer in a large meaning, and the capability to convey an electron consisting of a remarkable small material on the other hand, having the function to convey an electron hole, and conveying an electron hole.

[1055]It becomes an electron hole transportation layer from the material which has the function to convey an electron hole, and a hole injection layer and an electronic prevention layer are also contained in an electron hole transportation layer in a large meaning.

[1056]an electron hole transportation layer and an electron transport layer -- a monolayer -- or two or more layers can be provided.

[1057]In the organic EL device of this invention, it is preferred that the fluorescence maximum wavelength of the material of all the electron transport layers that adjoin the host of a luminous layer, the electron hole transportation layer which adjoins a luminous layer, and a luminous layer is 415 nm or less.

[1058]<<Luminous layer>> The electron and electron hole where the luminous layer concerning this invention is poured in from an electrode or an electron transport layer, and an electron hole transportation layer are a layer which joins together and emits light re-. The portion which emits light may be in the layer of a luminous layer, or may be an interface of a luminous layer and an adjacent layer.

[1059]As for the material (henceforth a luminescent material) used for a luminous layer, it is preferred that it is the organic compound or complex which emits fluorescence or phosphorescence, and it can be suitably chosen from the publicly known things used for the luminous layer of an organic EL device, and can be used. Such a luminescent material is mainly an organic compound.

Although the compound of Macromol.Synth., 125 volumes, and a 17-25-page description, etc. can be used with a desired color tone, for example, in this invention, said phosphorescence compound is preferred.

[1060]Said compound used as a luminescent material in this invention may have an electron hole transportation function and electronic transportation function other than luminescence performance, and most of electron hole transportation materials or electronic transportation materials can use it also as a luminescent material.

[1061]As other luminescent materials, the polymer material which p-poly phenylenevinylene and a polymer material like poly full OREN may be sufficient as, introduced said luminescent material into the polymer chain, or used said luminescent material as the main chain of a polymer may be used.

[1062]This luminous layer can be produced, for example by the thin film-ized method a vacuum evaporation method, a spin coat method, the cast method, the LB method, etc. are publicly known, and can form the above-mentioned compound. The film thickness as a luminous layer is usually chosen in 5 nm - 5 micrometers, although there is no restriction in particular. This luminous layer may be an one-layer structure which consists of these luminescent material kinds or two sorts or more, or may be a lamination structure which

consists of two or more layers of the same composition or different-species composition. A luminous layer consists of two or more sorts of materials, and the desirable mode of the organic EL device of this invention is a time of a kind of them being a compound of this invention.

[1063]After this luminous layer melts the above-mentioned luminescent material in a solvent and considers it as solution with binding material, such as resin, as indicated to JP,S57-51781,A, it can thin-film-ize this with a spin coat method etc., and can form it. Thus, although there is no restriction in particular and it can choose suitably about the film thickness of the formed luminous layer according to a situation, it is usually the range of 5 nm - 5 micrometers.

[1064]As for the dopant which calls the ingredient of a host and others a dopant for the main ingredients, and is applied to this invention, when the material which constitutes a luminous layer is two or more sorts, it is preferred that said phosphorescence compound is used.

[1065]In that case, the mixture ratio of a dopant to the host compound which is the main ingredients is less than 0.1 mass % - 15 mass % both in quality and in quantity preferably.

[1066](Host compound) In the white luminescence organic electroluminescence element of this invention, [ as a host compound ] The above, general formula (A1-1) - (A1-6) general formula (A2-1) - (A2-7), A general formula (B1-1), a general formula (B1-6), a general formula (B1-11), A general formula (B1-13), a general formula (B2-1) - (B2-8) a general formula (B3-1), (B3-2), general formula (B4-1), and general formula (B5-1) - (B5-3), A general formula (B6-1), (B6-2), a general formula (B7-1), a general formula (B8-1), General formula (B9-1), general formula (B10-1), and general formula (B11-1) - (B11-3), A general formula (C1-1-1), (C1-1-2), (C1-1-3), a general formula (C1-2-1), (C1-2-3), a general formula (C1-3) - (C1-7) a general formula (C1-8-1), (C1-8-2), general formula (C2-1), and general formula (C2-4) - (C2-7), A general formula (C3-1) - (C3-4) a general formula (C4-1), a general formula (C5-1), (C5-2), a general formula (C6-I) - (C6-V) a general formula (C7-1) - (C7-4) a general formula (C8-1) - (C8-6) a general formula (C9-1), a general formula (C10-1), General formula (C11-1), general formula (C12-1), and general formula (D1-1) - (D1-6), The compound denoted by general formula (D2-1) - (D2-6) and general formula (D3-1) - (D3-6), respectively, The polysilane which has the above and a structure unit expressed with the following general formula (C2-2) or (C2-3) to at least one

layer, The fluorogenic compound whose ratio (N/C) of the number of nitrogen atoms in a molecule to the number of carbon atoms is 0.05 or less [ 0 or more ], It was also said above that the fluorogenic compound etc. whose ratios [ as opposed to / as opposed to / in a fluorescence maximum wavelength / 415 nm or less / total of the hydrogen atom and fluorine atom in 500-2000, and a molecule in a molecular weight ] (F/(H+F)) of a fluorine atom are 0-0.9 are preferred.

[1067]As for the host compound of a luminous layer, it is preferred that they are an organic compound or a complex, and a fluorescence maximum wavelength is 415 nm or less preferably in this invention. In visible light and luminescence of said dopant, especially BGR luminescence is attained by the maximum wavelength of a host compound being 415 nm or less.

[1068]That is, by a fluorescence maximum wavelength being 415 nm or less, energy transmission type dopant luminescence which has pi-pi absorption in 420 nm or less is possible in usual pi conjugate fluorescence or phosphorescence material. From having fluorescence of 415 nm or less, since it is very a wide energy gap (ionization potential electron affinity, HOMO-LUMO), it works in favor also of a carrier trap type.

[1069]

As such a host compound, arbitrary things may be chosen and used out of the publicly known thing used for an organic EL device. Most of the aforementioned electron hole transportation materials or electronic transportation materials can use it also as a luminous layer host compound.

[1070]The polymer material which polyvinyl carbazole and a polymer material like poly full OREN may be sufficient as, introduced said host compound into the polymer chain, or used said host compound as the main chain of a polymer may be used.

[1071]As a host compound, having electron hole transportation ability and electronic transportation ability, long wavelength-ization of luminescence is prevented and the compound which is moreover high T<sub>g</sub> (glass transition temperature) is preferred.

[1072](Dopant) A dopant is described below.

[1073]Two sorts are mentioned as a principle, re-combination of a carrier takes place on the host by whom a carrier is conveyed, and the excitation state of a host compound generates one, The energy transmission type of obtaining luminescence from a dopant by moving this energy to a dopant, Although another is the carrier trap type that a dopant serves as a carrier trap, re-combination of a carrier takes place on a dopant compound, and luminescence from a dopant is obtained, It is conditions that the energy of the excitation state of a dopant compound is lower than the energy of the excitation state of a host compound in the case of which.

[1074]In the white luminescence organic electroluminescence element of this invention, things desirable as a dopant are a compound denoted by \*\* 589 - the-izing 591 especially Ir complex, and a compound denoted by this invention general formula (G1-1) - (G1-5).

[1075]Although this invention relates to the organic electroluminescence element which produces luminescence of real white, since there is nothing that shows white luminescence by a single luminescent material at present, two or more luminescence colors are made to emit light simultaneously by two or more luminescent materials, and white luminescence is obtained by mixed colors. What could make the luminescent material which has blue and three trichromatic green and blue luminescence maximum wavelengths contain as a combination of two or more luminescence colors, and contained the luminescent material which has two luminescence maximum wavelengths using the relation of \*\*\*\*, such as blue, yellow, bluish green, orange, may be used. The luminescent material which, of course, has four or more luminescence maximum wavelengths may be combined.

[1076]For example, in using a phosphorus \*\*\*\* dopant as a luminescent material, it obtains white luminescence by mixed colors using two or more dopants which have the aforementioned relation from which a luminescence wavelength differs. Also in the case of a fluorescence luminescent material, it is the same.

[1077]the luminescent material which emits light by what saw two or more sets of materials into which the combination of the luminescent material for obtaining two or more luminescence colors emits light by two or more phosphorescence or fluorescence, these fluorescence, or phosphorescence and the thing which combined the light from a luminescent material with the pigment material which emits light as excitation light -- any may be sufficient.

[1078]Although what is necessary is for there to be no restriction in particular as a material of a luminous layer, and to choose and combine arbitrary things and just to white-ize them out of the above and a publicly known luminescent material, As a luminescence host used when forming the element which emits light especially using phosphorescence, the material which includes partial structures, such as a carbazole derivative, a biphenyl derivative, a styryl derivative, a benzofuran derivative, a CHIOFEN derivative, and an ARIRUSHIRAN derivative, as a unit is mentioned. A carbazole derivative and a biphenyl derivative are desirable luminescent materials which show high luminous efficiency especially.

[1079]Conventionally [ aforementioned ] in [ what is necessary is just to have the function for there to be no restriction in particular in material when providing an electron hole transportation layer, but to transmit the electron hole from an anode electrode to the layer which emits light, and ] a photoconducting material, Arbitrary things can be chosen and used out of what is commonly used as an electric charge pouring material of an electron hole, and the publicly known thing used for the electron hole transportation layer of EL element.

[1080]When providing an electron transport layer, what is necessary is for there to be no restriction in particular and just to have the function to transmit the electron from a cathode electrode to the layer which emits light, and arbitrary things can be chosen and used out of the aforementioned publicly known material.

[1081]<<Electron hole transportation layer>> It becomes an electron hole transportation layer from the material which has the function to convey an electron hole, and a hole injection layer and an electronic prevention layer are also contained in an electron hole transportation layer in a large meaning. an electron hole transportation layer -- a monolayer -- or two or more layers can be provided.

[1082]In the white luminescence organic electroluminescence element of this invention, [ as an electron hole transportation material ] In [ although the compound denoted by the above, a general formula (E1-1), the general formula (E1-5), the general formula (E2-1), and a general formula (E2-5), respectively is preferred, there is no restriction in particular, and ] the former and photoconductive material, Arbitrary things can also be chosen and used out of the publicly known thing used for the hole injection layer of what commonly used as an electric charge pouring transportation material of an electron hole, or EL element, and an electron hole transportation layer.

[1083]Electron hole transportation material has barrier electronic pouring [ or ] of an electron hole, transportation, or nature.

They may be any of an organic matter and an inorganic substance.

Otherwise, for example A bird azole derivative, an oxadiazole derivative, an imidazole derivative, A PORIA reel alkane derivative, a pyrazoline derivative, and a pyrazolone derivative, A phenylene diamine derivative, an ARIRU amine derivative, an amino substitution chalcone derivative, An OKISAZORU derivative, a styryl anthracene derivative, a fluorenone derivative, a hydrazone derivative, a SUCHIRUBEN derivative, the Syros Zhang derivative, an aniline system copolymer and conductive polymer oligomer, especially CHIOFEN oligomer, etc. are mentioned.

[1084]As an electron hole transportation material, although the above-mentioned thing can be used, it is preferred to use a porphyrin compound, an aromatic series tertiary-amine compound and a styryl amine compound, especially an aromatic series tertiary-amine compound.

[1085]as the example of representation of an aromatic series tertiary-amine compound and a styryl amine compound -- the N, N, N', and N'-tetra-phenyl 4, 4'-JIAMINO phenyl;N, and N'-diphenyl N and N'-bis(3-methylphenyl)- [1 and 1'-biphenyl] -4 and 4'-Gia Min. (TPD);2 and 2-screw. (4-G p-tolylamino phenyl) Propane;1 and 1-screw. (4-G p-tolylamino phenyl) Cyclohexane;N, N, N', and N'-tetra p-trill 4 and 4'-JIAMINO biphenyl;1 and 1-bis(4-G p-tolylamino phenyl)-4-phenyl cyclohexane; A screw. (4-dimethylamino 2-methylphenyl) Phenyl methane;. A screw. (4-G p-tolylamino phenyl) A phenyl methane;N and N'-diphenyl N, N'-JI (4-methoxyphenyl)-4, and 4'-JIAMINO biphenyl;N,N,N' and N'-tetra-phenyl 4 and 4'-JIAMINO diphenyl ether;4 and 4'-screw. (Diphenylamino) KUODORI phenyl;N, N, N-bird (p-trill) amine;4-



(G p-tolylamino)-4' - [4-(G p-tolylamino) styryl] SUCHIRUBEN; 4-N and N-diphenylamino (2-diphenyl vinyl) benzene; 3-methoxy 4'-N and N-diphenylamino still benzene; N-phenyl carbazole, What has in molecule two condensation aromatic series rings written in US,5,061,569,B Description, for example, 4, and 4'-screw [N-(1-Naff Chill)-N-phenylamino] 4, 4', 4''-tris by which the bird phenylamine unit indicated to biphenyl (NPD) and JP,H4-308688,A was connected with 3 starburst type [N-(3-methylphenyl)-N-phenylamino] Bird phenylamine (MTDATA) etc. are mentioned.

[1086]The polymer material which introduced such materials into the polymer chain, or used such materials as the main chain of a polymer can also be used.

[1087]Inorganic compounds, such as p type-Si and p type-SiC, can also be used as electron hole pouring material and an electron hole transportation material.

[1088]As for the electron hole transportation material of an electron hole transportation layer, in this invention, it is preferred to have a fluorescence maximum wavelength in 415 nm or less. That is, electron hole transportation material prevents long wavelength-ization of luminescence, having electron hole transportation ability, and its compound which is moreover high Tg is preferred.

[1089]This electron hole transportation layer can form the above-mentioned electron hole transportation material, for example by thin-film-izing by publicly known methods, such as a vacuum evaporation method, a spin coat method, the cast method, the ink-jet method, and the LB method. Although there is no restriction in particular about the film thickness of an electron hole transportation layer, it is usually about 5-5000 nm. This electron hole transportation layer may be an one-layer structure which consists of a kind of the above-mentioned material, or two sorts or more.

[1090]<<Electron transport layer>> It becomes an electron transport layer from the material which has the function to convey an electron, and an electronic injection layer and an electron hole prevention layer are also contained in an electron transport layer in a large meaning. an electron transport layer -- a monolayer -- or two or more layers can be provided.

[1091]The following material is known as an electronic transportation material (it serves as electron hole prevention material) used for the electron transport layer which adjoins the negative pole side to a luminous layer when considering it as the electron transport layer of a monolayer, and two or more layers conventionally.

[1092]The electron transport layer should just have the function to transmit the electron poured in from the negative pole to a luminous layer, and arbitrary things can be conventionally chosen and used for it out of a publicly known compound as the material.

[1093]In the white luminescence organic electroluminescence element of this invention, the compound denoted by general formula (D1-1) - (D3-6) and (F1-1) - (F1-5) is preferred as an electron hole prevention material in the aforementioned compound concerning this invention.

[1094][ as an example of the material (henceforth electronic transportation material) used for this electron transport layer ] A nitroglycerine substitution fluorene derivative, a diphenyl quinone derivative besides said compound concerning this invention, Heterocyclic tetracarboxylic acid anhydrides, such as a thiopyran dioxide derivative and NAFTA REMPERIREN, a carbodiimide, a FUREORENIRIDEN methane derivative, anthra KINOJI methane and the Antron derivative, an oxadiazole derivative, etc. are mentioned. In the above-mentioned oxadiazole derivative, the thiadiazole derivative which replaced the oxygen atom of the oxadiazole ring by the sulfur atom, and the quinoxaline derivative which has the quinoxaline ring known as an electron withdrawing group can also be used as an electronic transportation material.

[1095]The polymer material which introduced such materials into the polymer chain, or used such materials as the main chain of a polymer can also be used.

[1096]The metal complex (Alq), for example, tris (8-KINORINORU) aluminum, of 8-KINORINORU derivative, Tris (5, 7-dichloro 8-KINORINORU) aluminum, tris (5, 7-dibromo 8-KINORINORU) aluminum, Tris (2-methyl 8-KINORINORU) aluminum, tris (5-methyl 8-

KINORINORU) aluminum, Metal complexes in which a central metal of these metal complexes replaced In, Mg, Cu, Ca, Sn, Ga, or Pb, such as bis(8-KINORINORU)zinc (Znq), can also be used as an electronic transportation material. In addition, a metal freelancer, metal phthalocyanines, or those ends can use preferably what is replaced with an alkyl group, a sulfonic group, etc. as an electronic transportation material. The JISUCHIRIRU pyrazine derivative illustrated as a material of a luminous layer can also be used as an electronic transportation material, and inorganic semiconductors, such as n type-Si and n type-SiC, as well as a hole injection layer and an electron hole transportation layer can be used as an electronic transportation material.

[1097]As for the desirable compound used for an electron transport layer, it is preferred to have a fluorescence maximum wavelength in 415 nm or less. That is, the compound used for an electron transport layer prevents long wavelength-ization of luminescence, having electronic transportation ability, and its compound which is moreover high Tg is preferred.

[1098]<<Base (it is called a substrate, a substrate, a base material, etc.)>>, [ as a base concerning the organic EL device of this invention ] There is no limitation in particular in kinds, such as glass and a plastic, and if transparent, there will be no restriction in particular, but as a substrate used preferably, glass, quartz, and a light transmittance state resin film can be mentioned. Especially a desirable base is a resin film which can give flexible nature to an organic EL device.

[1099]As a resin film, for example Polyethylene terephthalate (PET), Polyethylenenaphthalate (PEN), polyether sulphone (PES), The film etc. which consist of polyether imide, a polyether ether ketone, poly phenylene sulphide, poly arylate, polyimide, polycarbonate (PC), cellulose bird acetate (TAC), cellulose acetate propionate (CAP), etc. are mentioned.

[1100]On the surface of the resin film, the film of an inorganic substance or an organic matter or the both hybrid film may be formed.

[1101]As for the external extraction efficiency in the room temperature of luminescence of the organic electroluminescence element of this invention, it is preferred that it is 1% or more, and

it is not less than 2% more preferably. It is number of electrons x100 passed to the number of photons / organic EL device luminous to the external extraction quantum efficiency (%) = organic EL device exterior here.

[1102]Hue improvement filters, such as a color filter, etc. may be used together.

[1103]Although the white luminescence organic electroluminescence display element of this invention consists of an organic EL device which has at least two kinds of different luminescence maximum wavelengths, the suitable example which produces an organic EL device is explained.

[1104]<<Manufacturing method of an organic EL device>> The method of producing the organic EL device which consists of an anode / hole injection layer / electron hole transportation layer / luminous layer / electron transport layer / an electronic injection layer / the negative pole is explained as an example of the manufacturing method of the organic EL device of this invention.

[1105]1 micrometer or less of thin films which consist of desired electrode substance, for example, substance for anodes, are made to form by methods, such as vapor deposition and sputtering, on a suitable base, first, so that it may become film thickness (10 nm - 200 nm) preferably, and an anode is produced. Next, the organic compound thin film of a hole injection layer, an electron hole transportation layer, a luminous layer, an electron transport layer, an electronic injection layer, and an electron hole prevention layer which is element material is made to form on this.

[1106]As the method of thin-film-izing of this organic compound thin film, although there are a spin coat method, the cast method, the ink-jet method, a vapor-depositing method, the printing method, etc. like the above, especially the point of a homogeneous film being easy to be obtained and being hard to generate a pinhole to a vacuum evaporation method or a spin coat method is preferred. The different producing-film method for every layer may be applied. When adopting the vapor-depositing method as film production, the vapor deposition condition changes with kinds etc. of compound to be used, but. It is desirable to choose suitably

generally in the range of 0.01 nm - 50nm/second in boat cooking temperature [ of 50-450 \*\* ] and degree-of-vacuum  $10^{-6}$ Pa -  $10^{-2}$ Pa, and vapor deposition speed, substrate temperature- 50 \*\*-300 \*\*, and 0.1 nm - 5 micrometers of film thickness.

[1107]A desired organic EL device is obtained by making the thin film which consists of a substance for the negative poles on it form by methods, such as vapor deposition and sputtering, after formation of these layers, so that 1 micrometer or less may become the film thickness of the range of 50 nm - 200 nm preferably, and providing the negative pole. Although it is preferred for it to be consistent by one vacuum suction, and to produce from a hole injection layer to the negative pole as for production of this organic EL device, it may give the producing-film method which takes out on the way and is different. In that case, consideration of working under dry inactive gas atmosphere is needed.

[1108]Drawing 1 is what simplifies and shows an example of the embodiment of the white organic electroluminescence element concerning this invention, It has formed in the surface of the substrates 10, such as glass, by laminating the anode 1, the electron hole transportation layer 11, the luminous layer (it consists of a luminescent material (dopant) and a host compound typically) 3, the electron transport layer 12, and the negative pole 2. and the anode 1 -- right voltage -- the negative pole 2 -- negative voltage -- the voltage 2-40 -- if it impresses about V, the electron poured into the luminous layer 3 via the electron transport layer 12 and the hole poured into the luminous layer 3 via the electron hole transportation layer 11 will re-join together within the luminous layer 3, and luminescence will take place.

[1109]Although it is as aforementioned about the material which constitutes each layer, In order to constitute a white light emitting element the simplest, [ the luminescent material used with the host compound in a luminous layer ] . Luminescent property has a relation of \*\*\*\* mutually, for example, combine two sorts of dopants which have a luminescence color which has a relation of \*\*\*\*, such as blue, yellow or bluish green, and \*\*. The dopant (phosphorus \*\*\*\* compound) which emits light in blue, green, and red at 3 colors, respectively can be suitably obtained by mixing and doping, taking the luminous efficiency into consideration. Of course, in order to obtain sufficient white light, four or more sorts of luminescent materials may be combined.

[1110][ the white organic electroluminescence element of this invention ] Only mix a dopant fundamentally and a mask is provided only at the time of formation of a luminous layer, an electron hole transportation layer, or an electron transport layer, What is necessary is just to arrange distinguishing by different color with with a mask etc. simply, and since other layers are common, patterning of a mask etc. is unnecessary, can form for example, an electrode film in the whole surface by the vapor-depositing method, the cast method, spin coat method, the ink-jet method, the printing method, etc., and productivity's improves. According to this method, unlike the white organic electroluminescence device which carried out parallel arrangement of the light emitting element of two or more colors to the shape of an array, the element itself is luminescence white.

[1111]It is also possible to make a production order reverse and to produce it in order of the negative pole, an electronic injection layer, an electron transport layer, a luminous layer, an electron hole transportation layer, a hole injection layer, and an anode.

[1112]Thus, white luminescence can be observed, if + is impressed for an anode and it impresses about voltage 2-40V for the negative pole as polarity of -, in impressing direct-current voltage to the obtained white display element. Even if it impresses voltage by reverse polarity, luminescence is not produced at all, without current flowing. In impressing a volts alternating current, it emits light, only when an anode becomes + and the negative pole changes into the state of -. The waveform of the exchange to impress may be arbitrary.

[1113]Although the white luminescence organic EL device of this invention can be used for a display device, a display, and various luminescence light sources, it is used also for a display device useful as the object for home Lighting Sub-Division, Lighting Sub-Division in the car, a kind of lamp like an exposure light source, and backlight of a liquid crystal display.

[1114]In addition, the use of wide ranges, such as a common domestic electric appliance which needs display devices, such as light sources, such as backlight, such as a clock, a signboard advertisement, a signal, and an optical storage, a light source of an electro photography copying machine, a light source of an optical-communications processing machine, and a light source of a photosensor, is mentioned.

[1115]

[Working example]Although an embodiment explains this invention concretely below, thereby, this invention is not limited.

[1116]The base film surface which forms an organic electroluminescence element by embodiment 1 <creation of organic electroluminescence element> oxygen plasma was etched. Next, on the etched base film, ITO was formed by 100-nm film thickness by the sputtering method, and the transparent anode electrode used as a transparent electrode layer was formed. Next, as a mask, using the stainless steel thin film board with an opening (100 mm x 100 mm), alpha-NPD was vapor-deposited in vapor deposition rate 5A/s by resistance heating, membranes were formed by 20-nm film thickness, and it was considered as the electron hole transportation layer under the environment of degree-of-vacuum  $10^{-4}$ Pa using the vacuum evaporation method. Next, vapor codeposition of phosphorescence dopant Ir-12 was carried out [ CBP which is a luminescence host ] for phosphorescence dopant Ir-6 in vapor deposition rate 0.2A/s vapor deposition rate 0.05A/s vapor deposition rate 5A/s by resistance heating on the electron hole transportation layer using the mask, membranes were formed by 30-nm film thickness, and it was considered as the luminous layer. Next, on a luminous layer, vapor-deposit BC in vapor deposition rate 5A/s by resistance heating using a mask, and membranes are formed by 10-nm film thickness, After considering it as the electron transport layer which served as the electron hole prevention layer, Alq<sub>3</sub> was vapor-deposited in vapor deposition rate 5A/s, membranes were formed by 40-nm film thickness, and the electron transport layer of the laminated constitution by BC layer and an Alq<sub>3</sub> layer was formed.

[1117]Next, a stainless steel mask with the opening of predetermined electrode pattern shape is used, After vapor-depositing lithium fluoride in vapor deposition rate 0.1A/s by resistance heating and forming membranes by 0.5 nm of film thickness, The metal cathode electrode which vapor-deposits aluminum in vapor deposition rate 10A/s, forms membranes by 100-nm film thickness, and serves as an anti-electrode layer was formed, and the organic electroluminescence element 1-1 as a comparative example was created.

[1118]The organic electroluminescence element which is an embodiment of this invention as well as the organic electroluminescence element 1-1 was created except having transposed the compound used as a luminescence host to the compound shown in Table 1.

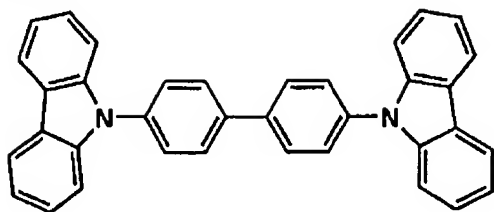
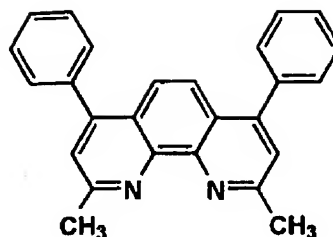
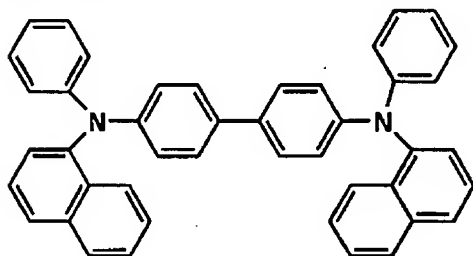
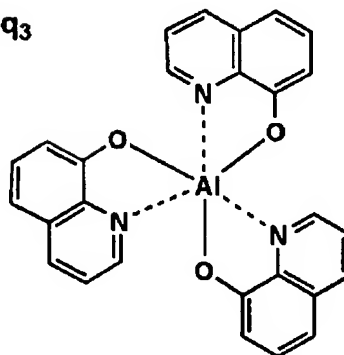
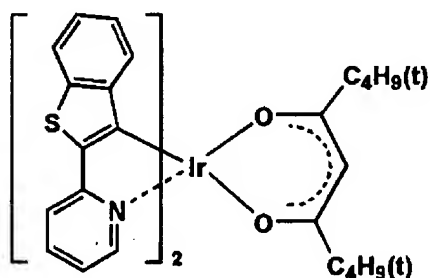
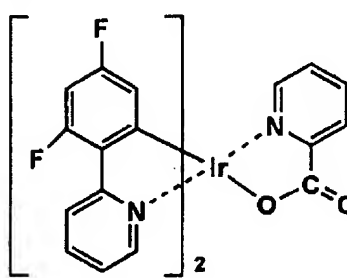
[1119]The organic electroluminescence element constituted by these realizes white luminescence by performing simultaneously luminescence with two luminescence maximum wavelengths using the phosphorescence of Ir-6 of said compound concerning CBP or this invention, and a phosphorescence dopant, and Ir-12.

[1120]The structural formula of CBP which is a luminescence host of the low-molecular material used above, Ir-6 of a phosphorescence dopant, Ir-12 and alpha-NPD, BC, and Alq<sub>3</sub> is shown below.

[1121]

[Chemical formula 592]



**CBP****BC** **$\alpha$ -NPD****Alq<sub>3</sub>****Ir-6****Ir-12**

[1122]Evaluation of the organic electroluminescence element which <organic electroluminescence element evaluated > created is performed as follows, and a result is shown in Table 1.

[1123](Luminescence luminosity, luminous efficiency) In the organic electroluminescence element 1-1, current began to flow on the initial drive voltage 3V, and blue luminescence from the phosphorescence compound which is a dopant of a luminous layer was shown.

Luminescence luminosity ( $\text{cd/m}^2$ ) when 10V direct-current voltage is impressed under the temperature of 23 °C of the organic electroluminescence element 1-1 and dry nitrogen-gas-

atmosphere, and luminous efficiency (lm/W) were measured.

[1124] Luminescence luminosity and luminous efficiency were denoted by the relative value when the organic electroluminescence element 1-1 was set to 100. About luminescence luminosity, it was measured using CS-1000 (made by Minolta).

[1125] (Endurance) When it drove with the fixed current of  $10\text{mA}/\text{cm}^2$ , the reduction-by-half life time which is the time taken for initial luminance to fall to the original half was expressed as an index. It was expressed with the relative value when the organic EL device 1-1 was set to 100 also about reduction-by-half life time.

[1126]

[Table 2]

素子	化合物	発光輝度	発光効率	耐久性	備考
1-1	C B P	100	100	100	比較例
1-2	A 1-1-8	120	118	202	実施例
1-3	A 1-2-2	124	116	205	実施例
1-4	A 1-2-4	131	120	180	実施例
1-5	A 1-3-5	122	112	179	実施例
1-6	A 1-4-1	127	122	299	実施例
1-7	A 1-5-2	125	133	247	実施例
1-8	A 1-5-5	119	113	214	実施例
1-9	A 1-6-2	127	117	209	実施例
1-10	A 1-6-15	129	130	287	実施例
1-11	A 2-1-2	140	144	253	実施例
1-12	A 2-2-6	137	144	167	実施例
1-13	A 2-2-11	135	131	169	実施例
1-14	A 2-4-6	136	133	291	実施例
1-15	A 2-4-8	141	139	233	実施例
1-16	A 2-5-1	143	147	222	実施例
1-17	A 2-5-8	137	133	201	実施例
1-18	A 2-5-14	138	137	271	実施例
1-19	A 2-6-1	129	128	265	実施例
1-20	A 2-6-3	135	130	197	実施例
1-21	A 2-7-2	144	131	252	実施例
1-22	A 2-7-5	137	134	190	実施例
1-23	A 2-7-6	141	130	169	実施例
1-24	B 1-(I)-9	142	150	169	実施例
1-25	B 1-(I)-38	147	140	246	実施例
1-26	B 1-(I)-69	139	136	183	実施例
1-27	B 1-(II)-12	146	138	255	実施例
1-28	B 1-(II)-40	147	152	303	実施例
1-29	B 1-(II)-64	150	158	242	実施例
1-30	B 2-3	134	122	160	実施例
1-31	B 2-18	129	127	260	実施例
1-32	B 2-25	140	143	202	実施例
1-33	B 3-1	126	117	268	実施例
1-34	B 3-4	134	126	223	実施例
1-35	B 3-7	139	148	300	実施例
1-36	B 3-9	141	137	216	実施例
1-37	B 3-11	136	142	265	実施例
1-38	B 4-1	125	120	169	実施例
1-39	B 4-3	127	116	228	実施例
1-40	B 4-19	130	120	185	実施例

[1127]

[Table 3]

素子	化合物	発光輝度	発光効率	耐久性	備考
1-41	B 5-1-1	148	153	303	実施例
1-42	B 5-1-5	151	152	156	実施例
1-43	B 5-1-12	146	152	196	実施例
1-44	B 5-2-2	139	141	263	実施例
1-45	B 5-2-8	128	121	207	実施例
1-46	B 5-2-15	134	140	263	実施例
1-47	B 5-3-1	128	126	226	実施例
1-48	B 5-3-2	130	125	278	実施例
1-49	B 6-1-1	131	138	178	実施例
1-50	B 6-1-2	141	140	277	実施例
1-51	B 6-1-5	138	127	301	実施例
1-52	B 6-2-3	124	114	156	実施例
1-53	B 6-2-11	124	113	292	実施例
1-54	B 6-2-18	130	137	182	実施例
1-55	B 7-1	126	117	242	実施例
1-56	B 7-8	132	127	185	実施例
1-57	B 7-19	145	139	303	実施例
1-58	B 7-25	134	139	266	実施例
1-59	B 7-28	138	134	269	実施例
1-60	B 8-3	130	131	253	実施例
1-61	B 8-8	136	127	156	実施例
1-62	B 8-18	141	129	204	実施例
1-63	B 8-59	137	129	168	実施例
1-64	B 8-70	138	142	172	実施例
1-65	B 9-8	129	130	208	実施例
1-66	B 9-12	135	137	212	実施例
1-67	B 9-28	142	132	295	実施例
1-68	B 9-42	138	140	259	実施例
1-69	B 9-53	133	128	232	実施例
1-70	B 10-3	126	119	286	実施例
1-71	B 10-4	124	117	233	実施例
1-72	B 10-11	128	131	163	実施例
1-73	B 11-1-1	125	118	288	実施例
1-74	B 11-1-5	133	132	283	実施例
1-75	B 11-1-20	140	129	272	実施例
1-76	B 11-2-1	132	133	163	実施例
1-77	B 11-3-4	130	122	187	実施例
1-78	B 11-4-1	125	131	266	実施例
1-79	B 11-4-2	124	122	178	実施例
1-80	B 11-4-4	137	128	186	実施例
1-81	C 1-1-52	151	150	162	実施例

[1128]

[Table 4]

素子	化合物	発光輝度	発光効率	耐久性	備考
1-82	C 1-1-53	130	138	280	実施例
1-83	C 1-2-1	130	121	216	実施例
1-84	C 1-2-2	150	148	220	実施例
1-85	C 1-3-1	132	122	254	実施例
1-86	C 1-3-31	128	138	273	実施例
1-87	C 1-4-1	123	119	266	実施例
1-88	C 1-5-4	139	127	183	実施例
1-89	C 1-5-16	143	145	268	実施例
1-90	C 1-6-9	134	130	267	実施例
1-91	C 1-7-1	137	125	299	実施例
1-92	C 1-7-26	136	143	265	実施例
1-93	C 1-8-1	142	145	255	実施例
1-94	C 1-8-3	131	126	267	実施例
1-95	C 1-9-5	140	146	221	実施例
1-96	C 2-1-3	136	144	209	実施例
1-97	C 2-1-9	128	123	206	実施例
1-98	C 2-1-17	131	123	244	実施例
1-99	C 2-4-1	136	124	214	実施例
1-100	C 2-4-13	132	123	246	実施例
1-101	C 2-5-2	133	126	257	実施例
1-102	C 2-5-9	130	121	252	実施例
1-103	C 2-6-2	137	124	249	実施例
1-104	C 2-7-3	151	137	187	実施例
1-105	C 4-1	140	132	238	実施例
1-106	C 4-5	135	122	300	実施例
1-107	C 4-10	129	132	201	実施例
1-108	C 5-1	149	156	165	実施例
1-109	C 5-10	125	127	203	実施例
1-110	C 5-15	122	119	263	実施例
1-111	C 6-1	145	148	204	実施例
1-112	C 6-6	130	137	177	実施例
1-113	C 6-38	123	128	275	実施例
1-114	C 6-NT-1	141	150	178	実施例
1-115	C 6-NT-11	127	131	207	実施例
1-116	C 6-NP-1	151	148	286	実施例
1-117	C 6-1-1	140	142	272	実施例
1-118	C 6-1-2	141	131	213	実施例
1-119	C 6-5-5	146	133	205	実施例
1-120	C 7-A-4	142	144	272	実施例
1-121	C 7-A-9	134	139	255	実施例

[1129]

[Table 5]



素子	化合物	発光輝度	発光効率	耐久性	備考
1-122	C7-A-10	137	134	176	実施例
1-123	C7-C-8	145	147	256	実施例
1-124	C7-D-1	140	144	188	実施例
1-125	C7-E-6	133	140	175	実施例
1-126	C7-E-11	125	119	199	実施例
1-127	C7-H-4	136	135	206	実施例
1-128	C7-H-7	128	117	195	実施例
1-129	C7-H-10	135	134	292	実施例
1-130	C8-1-1	122	114	296	実施例
1-131	C8-1-4	149	140	241	実施例
1-132	C8-1-7	128	118	285	実施例
1-133	C8-2-3	127	121	212	実施例
1-134	C8-2-5	130	134	305	実施例
1-135	C8-3-1	141	141	272	実施例
1-136	C8-4-1	148	144	175	実施例
1-137	C8-4-3	138	140	284	実施例
1-138	C8-4-5	123	125	208	実施例
1-139	C8-5-2	143	147	232	実施例
1-140	C8-5-5	144	151	227	実施例
1-141	C8-6-1	127	117	207	実施例
1-142	C8-6-5	142	146	163	実施例
1-143	C8-6-8	132	127	299	実施例
1-144	1	134	142	289	実施例
1-145	4	145	154	263	実施例
1-146	10	129	135	244	実施例
1-147	11	136	142	255	実施例
1-148	C9-A-1	128	123	183	実施例
1-149	C9-A-2	130	124	165	実施例
1-150	C9-A-3	125	124	254	実施例
1-151	(C-1)/(A-9)	148	154	160	実施例
1-152	(D-1)/(B-3)	132	121	291	実施例
1-153	(D-1)/(B-1)	148	136	224	実施例
1-154	C11-7	139	129	218	実施例
1-155	C11-39	127	132	222	実施例
1-156	C11-63	144	139	304	実施例
1-157	C12-A-1	126	134	192	実施例
1-158	C12-A-2	149	148	280	実施例
1-159	C12-A-3	146	137	285	実施例
1-160	D1-1-8	126	126	250	実施例
1-161	D1-2-2	149	149	163	実施例
1-162	D1-2-3	124	122	268	実施例

[1130]

[Table 6]

素子	化合物	発光輝度	発光効率	耐久性	備 考
1-163	D 1-3-1	149	144	169	実施例
1-164	D 1-4-4	146	148	304	実施例
1-165	D 1-5-2	122	124	221	実施例
1-166	D 1-6-3	146	139	225	実施例
1-167	D 1-7-1	132	133	163	実施例
1-168	D 1-7-4	145	143	194	実施例
1-169	D 2-1-4	146	154	184	実施例
1-170	D 2-2-3	135	127	182	実施例
1-171	D 2-3-1	141	146	166	実施例
1-172	D 2-4-3	142	139	188	実施例
1-173	D 2-5-8	137	125	267	実施例
1-174	D 2-6-1	135	128	166	実施例
1-175	D 3-1-6	145	144	290	実施例
1-176	D 3-1-9	148	140	300	実施例
1-177	D 3-2-3	124	113	223	実施例
1-178	D 3-3-4	124	128	167	実施例
1-179	D 3-5-2	143	131	158	実施例
1-180	D 3-6-5	139	133	156	実施例
1-181	D 3-8-1	126	116	294	実施例

[1131]In the passage clear to Tables 2-6, the white luminescence organic electroluminescence element of this invention has high luminescence luminosity and luminous efficiency, and also the endurance improved sharply. [ besides having indicated to Tables 2-6 ] Illustration compound A1-1-1 - A1-6-17, A2-1-1 - A2-7-7, B1-(I)-1 - B1-(II)-110, B-2-1 - B-2-33, and B3-1 - B3-15, B4-1 - B4-20, B5-1-1 - B5-3-6, and B6-1-1 - B6-2-23, B7-1 - B7-32, B8-1 - B8-76, B9-1

- B9-54, B10-1 - B10-15, B11-1-1 - B11-4-4, C1-1-1 - C1-9-5, C2-1-1 - C2-7-4, and C4-1 - C4-15, and C5-1 - C5-20, C6-1 - C6-50, C6-NT-1 - C6-NT-20, C6-NP-1 - C6-NP-16, and C6-1-1 - C6-2-6, and C6-5-1 - C6-5-12, C7-A-1 - C7-I-8, and C8-1-1 - C8-6-14, 1-17, C9-A-1 - C9-A-16, the concrete compound of others which are denoted by a general formula (C10-1), The same effect was acquired in the element which used the C11-1 - C11-63, C12-A-1 - C12-A-15, D1-1-1 - D1-7-4, D2-1-1 - D2-6-4, D3-1-1 - D3-8-5 grade for the luminescence host, and constituted it.

[1132][ except having used the compound which was replaced with said BC used for the electron transport layer of the organic electroluminescence element 1-1 indicated in the embodiment 2 Embodiment 1, and was indicated to Tables 7-9 ] The organic electroluminescence element 1-1 and the organic electroluminescence element which starts this invention in a similar way were produced. It is shown in Tables 7-9 with the compound concerning this invention which replaced with BC the result of having evaluated luminescence luminosity, luminous efficiency, and endurance as well as Embodiment 1, and used it.

[1133]

[Table 7]

素子	化合物	発光輝度	発光効率	耐久性	備考
1-1	BC	100	100	100	比較例
2-1	A1-1-8	143	131	205	実施例
2-2	A1-2-2	155	160	280	実施例
2-3	A1-2-4	135	132	227	実施例
2-4	A1-3-5	130	120	277	実施例
2-5	A1-4-1	130	130	253	実施例
2-6	A1-5-2	147	147	214	実施例
2-7	A1-5-5	164	169	216	実施例
2-8	A1-6-2	143	132	226	実施例
2-9	A1-6-15	148	136	239	実施例
2-10	A2-1-4	136	131	220	実施例
2-11	A2-1-5	147	156	197	実施例
2-12	A2-2-11	150	139	286	実施例
2-13	A2-4-6	135	127	205	実施例
2-14	A2-4-9	160	162	247	実施例
2-15	A2-5-5	139	142	256	実施例
2-16	A2-5-8	138	129	166	実施例
2-17	A2-6-1	150	150	270	実施例
2-18	A2-6-3	166	153	244	実施例
2-19	B1-(I)-9	133	133	285	実施例
2-20	B1-(I)-38	155	142	230	実施例
2-21	B1-(I)-69	157	142	310	実施例
2-22	B1-(II)-12	163	169	274	実施例
2-23	B1-(II)-40	130	131	257	実施例
2-24	B1-(II)-64	136	127	184	実施例
2-25	B2-3	149	136	220	実施例
2-26	B2-18	148	142	256	実施例
2-27	B2-25	137	133	209	実施例
2-28	B3-1	139	145	206	実施例
2-29	B3-4	154	159	180	実施例
2-30	B3-7	138	129	271	実施例
2-31	B3-9	140	140	227	実施例
2-32	B3-11	138	141	230	実施例
2-33	B4-1	135	143	240	実施例
2-34	B4-3	126	127	296	実施例
2-35	B4-19	157	158	236	実施例
2-36	B5-1-1	163	152	180	実施例
2-37	B5-1-5	153	158	169	実施例
2-38	B5-1-12	127	126	256	実施例
2-39	B5-2-2	152	146	251	実施例
2-40	B5-2-8	150	145	206	実施例

[1134]

[Table 8]

素子	化合物	発光輝度	発光効率	耐久性	備考
2-41	B 5-2-15	165	164	296	実施例
2-42	B 5-3-1	127	132	254	実施例
2-43	B 5-3-2	131	136	169	実施例
2-44	B 6-1-1	139	132	191	実施例
2-45	B 6-1-2	128	121	263	実施例
2-46	B 6-1-5	166	153	253	実施例
2-47	B 6-2-3	145	133	177	実施例
2-48	B 6-2-11	129	124	311	実施例
2-49	B 6-2-18	161	170	178	実施例
2-50	B 7-1	144	135	230	実施例
2-51	B 7-8	148	152	309	実施例
2-52	B 7-19	137	127	187	実施例
2-53	B 7-25	127	115	250	実施例
2-54	B 7-28	145	143	295	実施例
2-55	B 8-3	152	149	199	実施例
2-56	B 8-8	140	141	246	実施例
2-57	B 8-18	151	142	244	実施例
2-58	B 8-59	165	168	216	実施例
2-59	B 8-70	128	119	280	実施例
2-60	B 9-8	139	137	258	実施例
2-61	B 9-12	133	125	303	実施例
2-62	B 9-28	156	145	227	実施例
2-63	B 9-42	136	142	239	実施例
2-64	B 9-53	135	144	279	実施例
2-65	B10-3	143	132	211	実施例
2-66	B10-4	129	129	281	実施例
2-67	B10-11	145	140	266	実施例
2-68	B11-1-1	137	135	256	実施例
2-69	B11-1-5	132	125	294	実施例
2-70	B11-1-20	144	146	261	実施例
2-71	B11-2-1	163	171	311	実施例
2-72	B11-3-4	163	160	299	実施例
2-73	B11-4-1	153	158	189	実施例
2-74	B11-4-2	136	128	232	実施例
2-75	B11-4-4	146	155	281	実施例
2-76	1	128	119	209	実施例
2-77	4	141	132	288	実施例
2-78	10	141	136	254	実施例
2-79	11	131	135	292	実施例
2-80	D 1-1-8	150	138	223	実施例
2-81	D 1-2-2	148	154	206	実施例

[1135]

[Table 9]

素子	化合物	発光輝度	発光効率	耐久性	備考
2-82	D 1-2-3	127	120	260	実施例
2-83	D 1-3-1	154	156	261	実施例
2-84	D 1-4-4	164	159	303	実施例
2-85	D 1-5-2	134	137	235	実施例
2-86	D 1-6-3	154	146	167	実施例
2-87	D 1-7-1	141	142	315	実施例
2-88	D 1-7-4	166	164	281	実施例
2-89	D 2-1-4	130	132	226	実施例
2-90	D 2-2-3	144	137	186	実施例
2-91	D 2-3-1	136	133	229	実施例
2-92	D 2-4-3	132	125	305	実施例
2-93	D 2-5-8	153	147	173	実施例
2-94	D 2-6-1	167	160	219	実施例
2-95	D 3-1-6	138	135	305	実施例
2-96	D 3-1-9	157	143	302	実施例
2-97	D 3-2-3	137	132	250	実施例
2-98	D 3-3-4	142	138	245	実施例
2-99	D 3-5-2	126	120	252	実施例
2-100	D 3-6-5	132	122	296	実施例
2-101	D 3-8-1	129	135	255	実施例
2-102	F 1-1-5	167	152	272	実施例
2-103	F 1-1-17	158	151	221	実施例
2-104	F 1-1-26	141	128	148	実施例
2-105	F 1-2-1	129	119	305	実施例
2-106	F 1-3-5	161	167	269	実施例
2-107	F 1-3-6	144	147	283	実施例
2-108	F 1-3-13	167	164	173	実施例
2-109	F 1-4-1	156	162	261	実施例
2-110	F 1-4-10	148	144	300	実施例
2-111	F 1-5-1	131	132	297	実施例

[1136]In the passage clear from Tables 7-9, the white luminescence organic electroluminescence element of this invention has high luminescence luminosity and luminous

efficiency, and also the endurance improved sharply. [ besides having indicated to Tables 7-9 ] Illustration compound A1-1-1 - A1-6-17, A2-1-1 - A2-7-7, B1-(I)-1 - B1-(II)-1, B-2-1 - B-2-33, and B3-1 - B3-15, B4-1 - B4-20, B5-1-1 - B5-3-6, and B6-1-1 - B6-2-23, B7-1 - B7-32, B8-1 - B8-76, B9-1 - B9-54, B10-1 - B10-15, B11-1-1 - B11-4-4, 1-17, D1-1-1 - D1-7-4, D2-1-1 - D2-6-4, D3-1-1 - D3-8-5, The same effect was acquired in the element which used the F1-1-1 - F1-5-7 grade for the luminescence host, and constituted it.

[1137]The organic electroluminescence element 1-1 and the organic electroluminescence element which starts this invention in a similar way were created except having used the compound which was replaced with alpha-NPD and indicated to Table 10 at the electron hole transportation layer of the organic electroluminescence element 1-1 indicated in the embodiment 3. Embodiment 1. It is shown in Table 10 with the compound concerning this invention which replaced with alpha-NPD the result of having evaluated luminescence luminosity, luminous efficiency, and endurance as well as Embodiment 1, and used it.

[1138]

[Table 10]



素子	化合物	発光輝度	発光効率	耐久性	備考
1-1	$\alpha$ -NPD	100	100	100	比較例
3-1	A1-1-8	158	155	273	実施例
3-2	A1-2-2	130	129	222	実施例
3-3	A1-2-4	137	125	188	実施例
3-4	A1-3-5	156	150	248	実施例
3-5	A1-4-1	125	129	161	実施例
3-6	A1-5-2	149	142	189	実施例
3-7	A1-5-5	127	124	161	実施例
3-8	A1-6-2	130	131	231	実施例
3-9	A1-6-15	134	131	179	実施例
3-10	A2-5-9	145	152	170	実施例
3-11	A2-5-10	126	129	211	実施例
3-12	A2-5-12	146	153	205	実施例
3-13	E1-(18)	143	133	172	実施例
3-14	E1-(29)	143	133	195	実施例
3-15	E1-(50)	151	150	191	実施例
3-16	E1-(57)	140	128	154	実施例
3-17	E2-(1)	137	130	195	実施例
3-18	E2-(20)	135	143	257	実施例
3-19	E2-(22)	132	122	249	実施例
3-20	E2-(31)	147	138	215	実施例
3-21	E2-(39)	136	135	200	実施例

[1139]In the passage clear from Table 10, the white luminescence organic electroluminescence element of this invention has high luminescence luminosity and luminous efficiency, and also the endurance improved sharply. The same effect was acquired in the element which used illustration compound A1-1-1 - A1-6-17, A2-1-1 - A2-7-7, E1-(1) -E1-(82) E2-(1) -E2-(42), etc. for the luminescence host, and constituted them also besides having indicated to Table 10.

[1140][ except having transposed phosphorescence dopant Ir-6 in the organic electroluminescence element 1-1 indicated in the embodiment 4 Embodiment 1 to the compound concerning this invention ] The organic electroluminescence element 1-1 and the organic electroluminescence element 4-1-3 which starts this invention in a similar way were produced. The element 4-4-11 which transposed Ir-12 in the organic electroluminescence element 1-1 to the compound concerning this invention similarly was produced. Luminescence luminosity, luminous efficiency, and endurance as well as [ elements / these ] Embodiment 1 are evaluated, and the result is shown in Table 11.

[1141].

[Table 11]

素子	化合物	発光輝度	発光効率	耐久性	備 考
1 - 1	Ir-6 / Ir-12	100	100	100	比較例
4 - 1	G 1 - 2 - 6	138	145	272	実施例
4 - 2	G 1 - 5 - 1	160	158	295	実施例
4 - 3	G 1 - 5 - 2	161	157	154	実施例
4 - 4	G 1 - 1 - 4	164	166	237	実施例
4 - 5	G 1 - 1 - 12	141	142	281	実施例
4 - 6	G 1 - 1 - 21	159	155	180	実施例
4 - 7	G 1 - 2 - 2	171	181	170	実施例
4 - 8	G 1 - 2 - 8	132	123	183	実施例
4 - 9	G 1 - 3 - 2	139	138	254	実施例
4 - 10	G 1 - 4 - 1	149	157	273	実施例
4 - 11	G 1 - 4 - 6	148	151	275	実施例

[1142]In the passage clear from Table 11, the white luminescence organic electroluminescence element of this invention has high luminescence luminosity and luminous

efficiency, and also the endurance improved sharply. The same effect was acquired in the element which used illustration compound G1-1-1 - G1-5-6 for the luminescence host, and constituted it also besides having indicated to Table 11.

[1143]

[Effect of the Invention]The efficient and long lasting organic electroluminescence element which has uniform white luminescence was obtained.

[Brief Description of the Drawings]

[Drawing 1]The figure showing an example of the embodiment of the white organic electroluminescence element concerning this invention.

[Explanations of letters or numerals]1 Anode 2 negative-pole 3 luminous-layer 10 board 11 electron-hole transportation layer 12 Electron transport layer

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[Translation done.]